

CRPL-F 223 PART A

FOR OFFICIAL USE

National Bureau of Standards  
Library, N.W. Bldg

APR 8 1963

Reference book not to be  
taken from the library.

PART A  
IONOSPHERIC DATA

ISSUED  
MARCH 1963

U. S. DEPARTMENT OF COMMERCE  
NATIONAL BUREAU OF STANDARDS  
CENTRAL RADIO PROPAGATION LABORATORY  
BOULDER, COLORADO



C.PL-F 223

PART A

NATIONAL BUREAU OF STANDARDS  
CENTRAL RADIO PROPAGATION LABORATORY  
BOULDER, COLORADO

Issued  
22 March 1963

## IONOSPHERIC DATA

### CONTENTS

	<u>Page</u>
Ionospheric Data (revised text) . . . . .	ii
Table of Smoothed Observed Zurich Sunspot Numbers . . . . .	iii
World-Wide Sources of Ionospheric Data . . . . .	iv
Tables of Ionospheric Data . . . . .	1
Graphs of Ionospheric Data . . . . .	26
Index of Tables and Graphs of Ionospheric Data in CRPL-F223 (Part A) . . . . .	51

## IONOSPHERIC DATA

The CRPL-F series bulletins are issued as part of the responsibility of the Central Radio Propagation Laboratory for the exchange and distribution of ionospheric and related geophysical data. Part A, "Ionospheric Data," and Part B, "Solar-Geophysical Data," of the CRPL-F series present a variety of data in convenient form for use in research in radio propagation and the ionosphere and in other geophysical problems.

The current form of the tables of ionospheric data provides the monthly medians and, in addition, the number of values entering into the median determination (count) for all ionospheric characteristics listed. Also, when available, the upper and lower quartile values indicated by UQ and LQ in the tables, are listed for foF2, h'F2, h'F, and M(3000)F2. Quartile values are not listed for the other characteristics because of space limitations. The tables are prepared by IBM machine methods.

Beginning with CRPL-F221, Part A, "Ionospheric Data," the hourly median values for the graphs of critical frequencies and M(3000)F2 were plotted by machine methods instead of manually, as in earlier issues. Graphs of critical frequencies and M(3000)F2 will continue to appear. Graphs of percentage of time of occurrence for fEs and virtual heights of the regular ionospheric layers are no longer included. Data on percentage of time of occurrence of fEs above 3, 5, and 7 Mc are available from the CRPL and the IGY World Data Center for Airglow and Ionosphere.

For many years, the tables of ionospheric data appearing in the F series, Part A, listed values of medians recomputed at CRPL. While this practice enforced a certain uniformity, it was subject to some valid criticism for tampering with the original data. The tables and graphs now show the ionospheric data as they are provided by the originating laboratory. Responsibility for the accuracy and reliability of the data rests entirely with the originator.

Medians of data for the U.S. stations are computed in accordance with the recommendations of the World-Wide Soundings Committee. Data will appear in the F series, Part A, only when the complete daily-hourly tabulations have been received by the CRPL or the IGY World Data Center A for Airglow and Ionosphere.

Information on symbols, terminology, and conventions may be found in the "URSI Handbook of Ionogram Interpretation and Reduction, of the World-Wide Soundings Committee," edited by W. R. Piggott and K. Rawer (Elsevier, 1961), which supersedes previous documents. A list of symbols is available from CRPL on request.

The following table contains the latest available information on smoothed observed Zurich sunspot numbers, beginning with the minimum of April 1954. Final numbers are listed through June 1961, the succeeding values being based on provisional data.

Smoothed Observed Zurich Sunspot Number

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1954				3	4	4	5	7	8	8	9	12
1955	14	16	19	23	29	35	40	46	55	64	73	81
1956	89	98	109	119	127	137	146	150	151	156	160	164
1957	170	172	174	181	186	188	191	194	197	200	201	200
1958	199	201	201	197	191	187	185	185	184	182	181	180
1959	179	177	174	169	165	161	156	151	146	141	137	132
1960	129	125	122	120	117	114	109	102	98	93	88	84
1961	80	75	69	64	60	56	53	52	52	51	50	48
1962	44	41	39	38	38	37	36	34				

Units of Ionospheric Data Tables

foF2, foEs - - - Tents of a megacycle  
 foF1, FoE - - - Hundredths of a megacycle  
 h'F2, h'F, h'E- Kilometers  
 (M3000)F2 - - - Hundredths

NOTE: Occasionally, when the median falls between two of the observed values, the median is carried an extra decimal place beyond these units. Those cases are easily identifiable by the extra digit appearing to the right of the number, in a column usually left blank.

MED - Median

CNT - Count

UQ - Upper Quartile

LQ - Lower Quartile

## WORLD-WIDE SOURCES OF IONOSPHERIC DATA

THE IONOSPHERIC DATA GIVEN IN TABLES 1 TO 100 AND FIGURES 1 TO 100 WERE ASSEMBLED BY THE CENTRAL RADIO PROPAGATION LABORATORY FOR ANALYSIS, CORRELATION AND DISTRIBUTION. THE FOLLOWING ARE THE SOURCES OF THE DATA IN THIS ISSUE:

REPUBLICA ARGENTINA, MINISTERIO DE MARINA.  
BUENOS AIRES, ARGENTINA

COMMONWEALTH OF AUSTRALIA, IONOSPHERIC PREDICTION SERVICE OF  
THE COMMONWEALTH OBSERVATORY.

BRISBANE, AUSTRALIA  
CANBERRA, AUSTRALIA  
TOWNSVILLE, AUSTRALIA  
WILKES STATION, ANTARCTICA

AUSTRALIAN DEPARTMENT OF NATIONAL DEVELOPMENT, BUREAU OF  
MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS.  
MUNDARING, WESTERN AUSTRALIA

UNIVERSITY OF GRAZ.  
GRAZ, AUSTRIA

BELGIAN ROYAL METEOROLOGICAL INSTITUTE.  
DOURBES, BELGIUM

UNIVERSIDAD MAYOR DE SAN ANDRES.  
LA PAZ, BOLIVIA

BRITISH DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH,  
RADIO RESEARCH BOARD.  
FALKLAND IS.

DEFENCE RESEARCH BOARD, CANADA.  
CHURCHILL, CANADA  
OTTAWA, CANADA  
RESOLUTE BAY, CANADA  
ST. JOHNS, NEWFOUNDLAND  
WINNIPEG, CANADA

UNIVERSIDAD DE CONCEPCION.  
CONCEPCION, CHILE

RADIO WAVE RESEARCH LABORATORIES, NATIONAL TAIWAN UNIVERSITY,  
TAIPEH, FORMOSA, CHINA.  
FORMOSA, CHINA

CENTRAL AFRICAN INSTITUTE FOR SCIENTIFIC RESEARCH.  
LWIRO, CONGO

DANISH NATIONAL COMMITTEE OF URSI.  
NARSSARSSUAQ, GREENLAND

IONOSPHERIC RESEARCH GROUP (GRI), FRANCE.  
BANGUI, FRENCH EQUATORIAL AFRICA  
CASABLANCA, MOROCCO  
DAKAR, SENEGAL  
DJIBOUTI, FRENCH SOMALILAND  
PARIS, FRANCE  
POITIERS, FRANCE  
TAHITI, SOCIETY IS.  
TAMANRASSET, ALGERIA  
TANANARIVE, MALAGASY REPUBLIC

IONOSPHERE INSTITUTE, NATIONAL OBSERVATORY OF ATHENS.  
ATHENS (SCARAMANGA), GREECE

INDIAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH,  
RADIO RESEARCH COMMITTEE, NEW DELHI, INDIA.  
AHMEDABAD, INDIA (PHYSICAL RESEARCH LABORATORY)  
BOMBAY, INDIA (ALL INDIA RADIO)  
CALCUTTA, INDIA (INSTITUTE OF RADIO PHYSICS AND ELECTRONICS)  
DELHI, INDIA (ALL INDIA RADIO)  
KODAIKANAL, INDIA (INDIA METEOROLOGICAL DEPARTMENT)  
MADRAS, INDIA (ALL INDIA RADIO)  
TIRUCHY, INDIA (ALL INDIA RADIO)  
TRIVANDRUM, INDIA (ALL INDIA RADIO)

NATIONAL INSTITUTE OF GEOPHYSICS, CITY UNIVERSITY, ROME, ITALY.  
ROME, ITALY

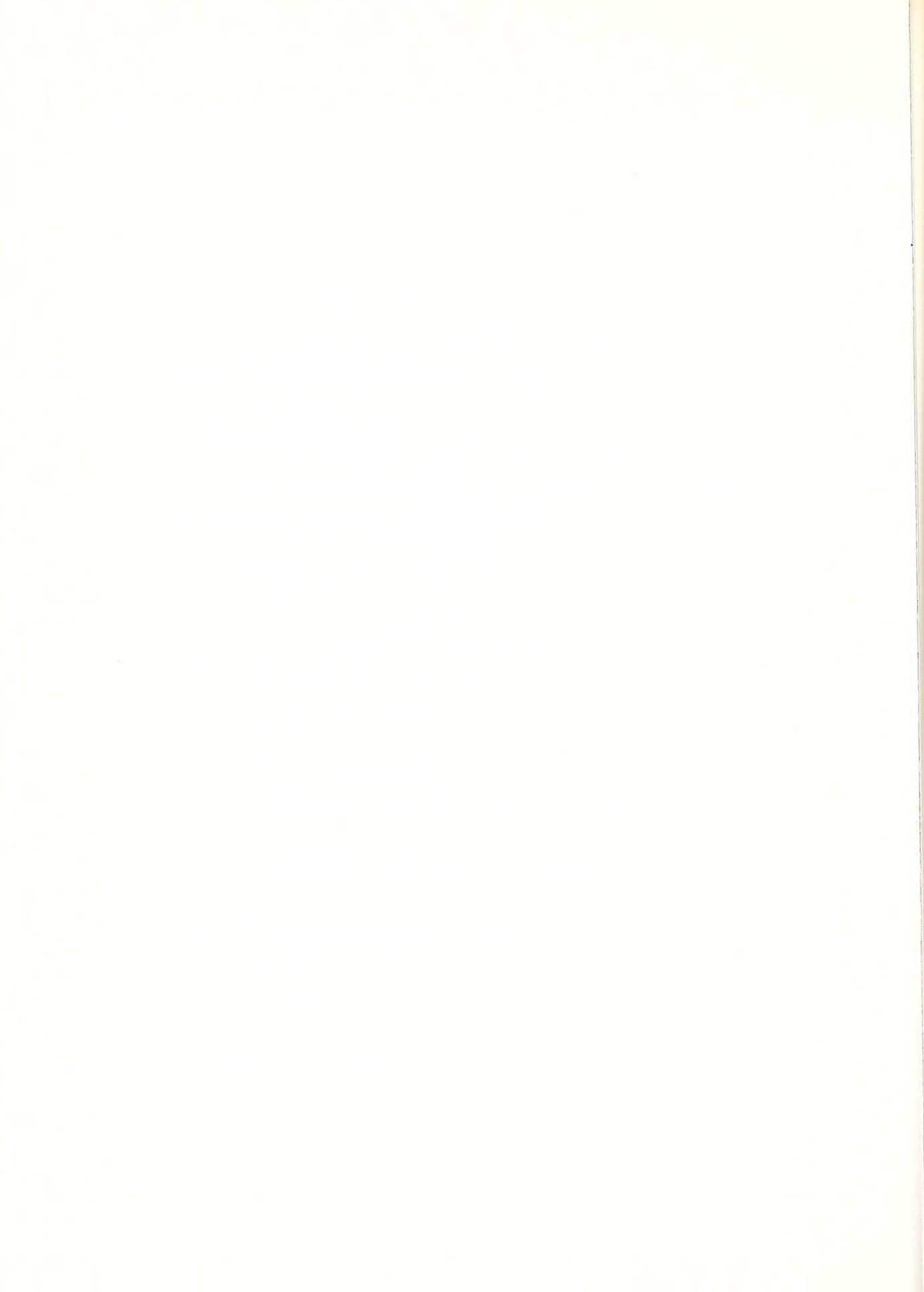
MANILA OBSERVATORY, PHILIPINES.  
BAGUIO, LUZON

INSTITUTE OF TELECOMMUNICATION, WARSAW, POLAND.  
WARSAW, POLAND

RESEARCH INSTITUTE OF NATIONAL DEFENCE, STOCKHOLM, SWEDEN.  
UPPSALA, SWEDEN

UNITED STATES ARMY SIGNAL CORPS., UNITED STATES OF AMERICA.  
ADAK, ALASKA  
FT. MONMOUTH, NEW JERSEY  
OKINAWA I.  
WHITE SANDS, NEW MEXICO

NATIONAL BUREAU OF STANDARDS, UNITED STATES OF AMERICA.  
(CENTRAL RADIO PROPAGATION LABORATORY).  
ANCHORAGE, ALASKA  
BARROW, ALASKA  
FAIRBANKS, ALASKA (GEOPHYSICAL INSTITUTE OF UNIVERSITY ALASKA)  
WASHINGTON, D.C.



TABLES OF IONOSPHERIC DATA

September 1962 - November 1966

- 8 -

BAGUETTE P. I.										
	hour	00	01	02	03	04	05	06	07	
fb F2	MED	U	6.5	6.0	5.5	3.0	3.0	4.8	7.0	7.8
	CNT	6.7	6.0	5.5	3.0	3.0	4.8	7.0	7.8	
	LQ	6.0	5.5	5.0	3.5	3.5	4.8	7.0	7.8	
	LQ	5.8	5.5	4.9	3.1	3.0	4.6	6.5	8.3	
h' F2	MED	U	2.5	2.4	3.4	2.0	2.4	2.5	2.5	2.5
	CNT	2.9	2.9	2.9	2.1	1.6	1.1	3.0	2.6	1.3
	LQ	2.9	2.9	2.9	2.1	1.6	1.1	3.0	2.6	1.3
	CD	2.9	2.9	2.9	2.1	1.6	1.1	3.0	2.6	1.3
h' F	MED	U	2.5	2.4	3.4	2.0	2.4	2.5	2.5	2.5
	CNT	2.9	2.9	2.9	2.1	1.6	1.1	3.0	2.6	1.3
	LQ	2.9	2.9	2.9	2.1	1.6	1.1	3.0	2.6	1.3
	CD	2.9	2.9	2.9	2.1	1.6	1.1	3.0	2.6	1.3
MB30000)F2	MED	U	3.0	3.0	3.5	3.0	3.0	3.0	3.5	3.5
	CNT	3.1	3.0	3.5	3.0	3.0	3.0	3.5	3.5	3.5
	LQ	3.0	3.0	3.5	3.0	3.0	3.0	3.5	3.5	3.5
	CD	3.0	3.0	3.5	3.0	3.0	3.0	3.5	3.5	3.5
fb F1	MED	U	3.0	3.0	3.5	3.0	3.0	3.0	3.5	3.5
	CNT	3.1	3.0	3.5	3.0	3.0	3.0	3.5	3.5	3.5
	LQ	3.0	3.0	3.5	3.0	3.0	3.0	3.5	3.5	3.5
	CD	3.0	3.0	3.5	3.0	3.0	3.0	3.5	3.5	3.5
fb E	MED	U	3.0	3.0	3.5	3.0	3.0	3.0	3.5	3.5
	CNT	3.1	3.0	3.5	3.0	3.0	3.0	3.5	3.5	3.5
	LQ	3.0	3.0	3.5	3.0	3.0	3.0	3.5	3.5	3.5
	CD	3.0	3.0	3.5	3.0	3.0	3.0	3.5	3.5	3.5
h' E	MED	U	3.0	3.0	3.5	3.0	3.0	3.0	3.5	3.5
	CNT	3.1	3.0	3.5	3.0	3.0	3.0	3.5	3.5	3.5
	LQ	3.0	3.0	3.5	3.0	3.0	3.0	3.5	3.5	3.5
	CD	3.0	3.0	3.5	3.0	3.0	3.0	3.5	3.5	3.5
f6 E1	MED	U	3.0	3.0	3.5	3.0	3.0	3.0	3.5	3.5
	CNT	3.1	3.0	3.5	3.0	3.0	3.0	3.5	3.5	3.5
	LQ	3.0	3.0	3.5	3.0	3.0	3.0	3.5	3.5	3.5
	CD	3.0	3.0	3.5	3.0	3.0	3.0	3.5	3.5	3.5

2

SEPTEMBER 1962

May 19

TABLE

15 • 6 MC 16 S MINUTES, AUTOMATIC.

JUNE, 1966

THE JOURNAL OF CLIMATE



For the first time, we have shown that the *in vitro* growth of *C. albicans* biofilms is inhibited by the addition of *in vivo* relevant concentrations of the antifungal agent amphotericin B.

TABLE II

卷之四

6

TIME 15000

1043

	HOUR	00	00	05	04	05	06
0/2	MED	-	-	-	-	-	-
CNT	-	-	-	-	-	-	-
LO	-	-	-	-	-	-	-
LO	-	-	-	-	-	-	-
F2	MED	-	-	-	-	-	-
CNT	0	-	-	-	-	-	-
LO	0	-	-	-	-	-	-
F	MED	-	-	-	-	-	-
CNT	0	-	-	-	-	-	-
LO	0	-	-	-	-	-	-
LO	0	-	-	-	-	-	-
W3000/1/2	MED	-	-	-	-	-	-
CNT	-	-	-	-	-	-	-
LO	-	-	-	-	-	-	-
O	-	-	-	-	-	-	-
O	-	-	-	-	-	-	-
F1	MED	-	-	-	-	-	-
CNT	-	-	-	-	-	-	-
LO	-	-	-	-	-	-	-
E	MED	-	-	-	-	-	-
CNT	-	-	-	-	-	-	-
E	MED	-	-	-	-	-	-
CNT	-	-	-	-	-	-	-

卷之三

\* \* \* \* \* TO 25.0 MC IN 13.5 SECONDS.

MARCH 4, 1962

ARCH., 1965

ELE 27

TABLE 1											
TIME 1200 HRS											
HOUR	00	01	02	03	04	05	06	07	08	09	10
ts F2	MED CNT UD LO										
h F2	MED CNT UD LO										
h F	MED CNT UD LO										
MI3000F2	MED CNT UD LO										
ts F1	MED CNT										
ts E	MED CNT										
h E	MED CNT										
ts E*	MED CNT										

TIME 1200 HRS

1962

TABLE 2											
TIME 1200 HRS											
HOUR	00	01	02	03	04	05	06	07	08	09	10
ts F2	MED CNT UD LO										
h F2	MED CNT UD LO										
h F	MED CNT UD LO										
MI3000F2	MED CNT UD LO										
ts F1	MED CNT										
ts E	MED CNT										
h E	MED CNT										
ts E*	MED CNT										

TIME 1200 HRS

1962

TABLE 33  
SOLUBILITY OF SULFURIC ACID

FEBRUARY ACTS

SALGOSANAS

JANUARY 1964

TIME 15

9

$$r_1 = r_2 = \dots = r_n$$

Z. EMBR., 1961

TOMS 1000



۴۷

1-2 MC TO 17-9 MC IN 1 MINUTE.

SCOTT MCGREGOR 196

TABLE 49

8LE 50

1.0 MC TO 18.0 MCG IN 2014

JUNE • 1962

SWEET 1-0 MC TO 25-0 MC IN 36 SECONDS

JUNE • 19

• SECTION 7 IN 250 MC TO 0 PIP

176

卷之三

卷之三

WILHELM SAVAGE: THE MECHANICS OF A LITERATURE

FEBRUARY + 1961

MARCH 1974

JULY 1961

876 57

245

— 57. 8. 7. 1961

EEG 1.0 MC . 16.0 MC IN 1 MINUTE 5.

TIME 15.00E  
WADDELL PLATEAU

卷之三

TABLES

卷之三

TIME 150°

160°

170°

180°

190°

200°

210°

220°

230°

240°

250°

260°

270°

280°

290°

300°

310°

320°

330°

340°

350°

360°

370°

380°

390°

400°

410°

420°

430°

440°

450°

460°

470°

480°

490°

500°

510°

520°

530°

540°

550°

560°

570°

580°

590°

600°

610°

620°

630°

640°

650°

660°

670°

680°

690°

700°

710°

720°

730°

740°

750°

760°

770°

780°

790°

800°

810°

820°

830°

840°

850°

860°

870°

880°

890°

900°

910°

920°

930°

940°

950°

960°

970°

980°

990°

1000°

1010°

1020°

1030°

1040°

1050°

1060°

1070°

1080°

1090°

1100°

1110°

1120°

1130°

1140°

1150°

1160°

1170°

1180°

1190°

1200°

1210°

1220°

1230°

1240°

1250°

1260°

1270°

1280°

1290°

1300°

1310°

1320°

1330°

1340°

1350°

1360°

1370°

1380°

1390°

1400°

1410°

1420°

1430°

1440°

1450°

1460°

1470°

1480°

1490°

1500°

1510°

1520°

1530°

1540°

1550°

1560°

1570°

1580°

1590°

1600°

1610°

1620°

1630°

1640°

1650°

1660°

1670°

1680°

1690°

1700°

1710°

1720°

1730°

1740°

1750°

1760°

1770°

1780°

1790°

1800°

1810°

1820°

1830°

1840°

1850°

1860°

1870°

1880°

1890°

1900°

1910°

1920°

1930°

1940°

1950°

1960°

1970°

1980°

1990°

2000°

2010°

2020°

2030°

2040°

2050°

2060°

2070°

2080°

2090°

2100°

2110°

2120°

2130°

2140°

2150°

2160°

2170°

2180°

2190°

2200°

2210°

2220°

2230°

2240°

2250°

2260°

2270°

2280°

2290°

2300°

2310°

2320°

2330°

2340°

2350°

2360°

2370°

2380°

2390°

2400°

2410°

2420°

2430°

2440°

2450°

2460°

2470°

2480°

2490°

2500°

2510°

2520°

2530°

2540°

2550°

2560°

2570°

2580°

2590°

2600°

2610°

2620°

2630°

2640°

2650°

2660°

2670°

2680°

2690°

2700°

2710°

2720°

2730°

2740°

2750°

2760°

2770°

2780°

2790°

2800°

2810°

2820°

2830°

2840°

2850°

2860°

2870°

2880°

2890°

2900°

2910°

2920°

2930°

2940°

2950°

2960°

2970°

2980°

2990°

3000°

3010°

3020°

3030°

3040°

3050°

3060°

3070°

3080°

3090°

3100°

3110°

3120°

3130°

3140°

3150°

3160°

3170°

3180°

3190°

3200°

3210°

3220°

3230°

3240°

3250°

3260°

3270°

3280°

3290°

3300°

3310°

3320°

3330°

3340°

3350°

3360°

3370°

3380°

3390°

3400°

3410°

3420°

3430°

3440°

3450°

3460°

3470°

3480°

3490°

3500°

3510°

3520°

3530°

3540°

3550°

3560°

3570°

3580°

3590°

3600°

3610°

3620°

3630°

3640°

3650°

3660°

3670°

3680°

3690°

3700°

3710°

3720°

3730°

3740°

3750°

3760°

3770°

3780°

3790°

3800°

3810°

3820°

383

A815 73

SCALPUS.

๐๙๖

TABLE 74

MAY \* 1948



TABLE 81

STEP 1.0 MC TO 16.0 MC IN 1 MINUTE - > ON5.

४६०

APLÉ 32

HOUR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
to F2	MED	-6	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110
	CNT	-6	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110
	LO	-6	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110
N' F2	MED	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	CNT	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	LO	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
h F	MED	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15
	CNT	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15
	LO	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15
M3000F2	MED	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12
	CNT	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12
	LO	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12
fo F1	MED	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18
	CNT	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18
	LO	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18
fo E	MED	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21
	CNT	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21
	LO	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21
N' E	MED	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23
	CNT	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23
	LO	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23

卷之三

卷之三

卷之三

8 L<sub>4</sub>

卷之三

JUNE • 1955

195

195

TAN

•

15.06

15.06

TABLE 89

APRIL • 1958

TABLE 90

APRIL • 1958

卷之三

TABLE 82

REED 1:2 MC 18 17:0 MC IN 1 MINUTE.

24

AUGUST, 1966

AUGUST 1968

1940 MARCH 5, TUESDAY 5 MINUTES

TABLE 97

EP 1.5 MIC TO 18.0 MC IN 5 MINUTES, MANUFACTURER.

AUGUST

TABLE 49

SECTION I. SPECIFIC TESTS AND METHODS. MANUAL.

37

Q77

A-U-U-T \* 1958

5

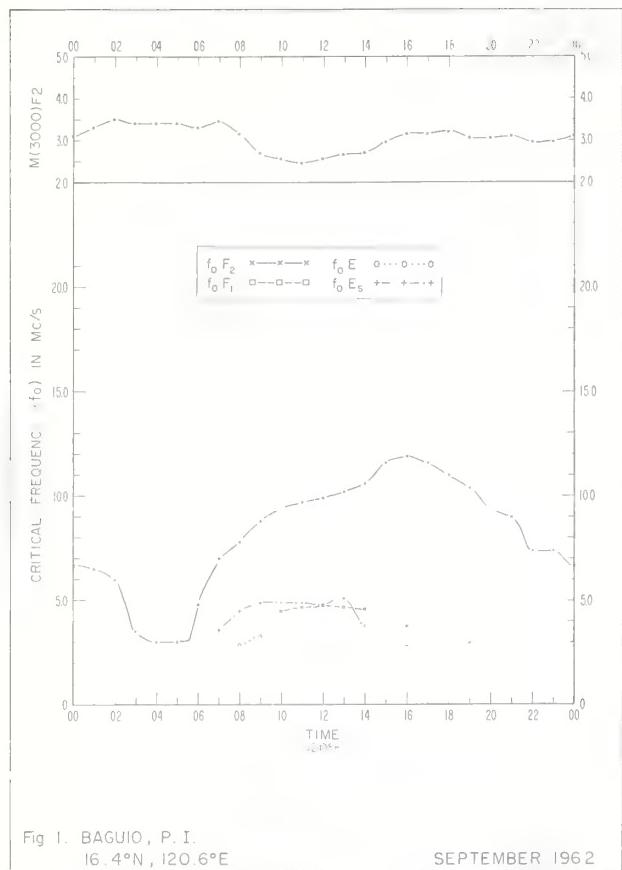


Fig. 1. BAGUIO, P. I.  
16.4°N, 120.6°E

SEPTEMBER 1962

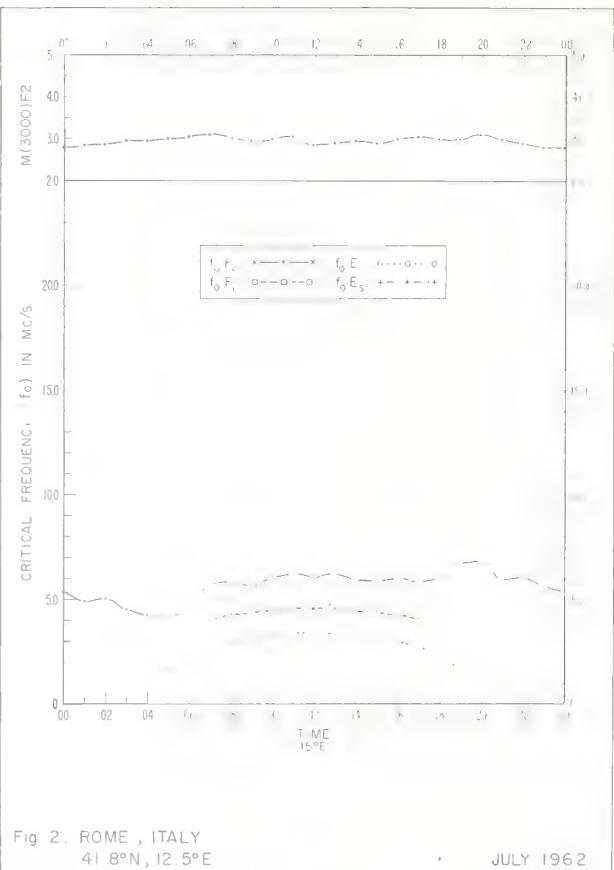


Fig. 2. ROME, ITALY  
41.8°N, 12.5°E

JULY 1962

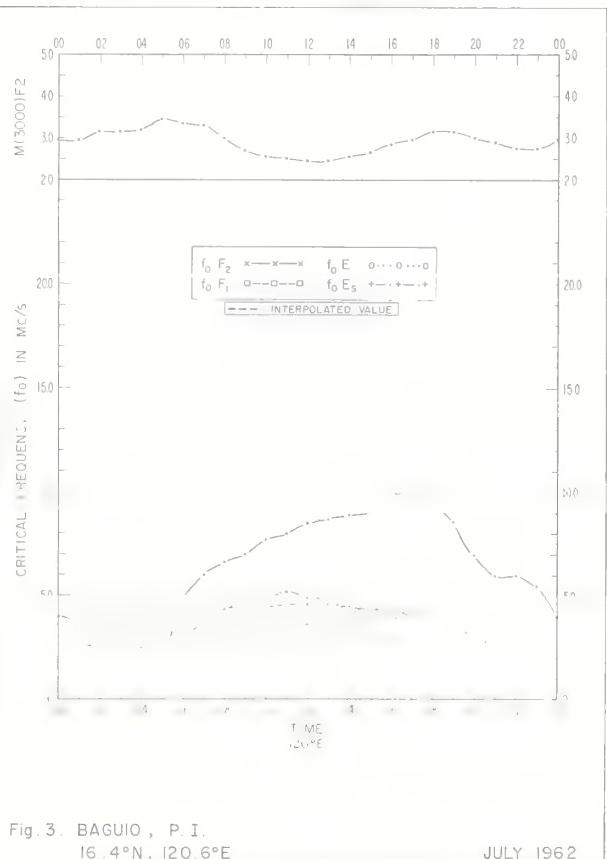


Fig. 3. BAGUIO, P. I.  
16.4°N, 120.6°E

JULY 1962

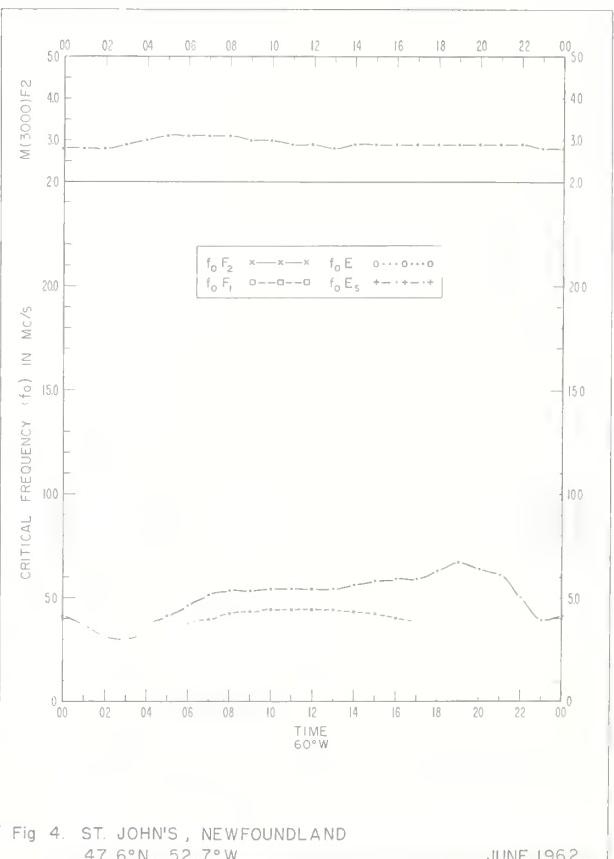
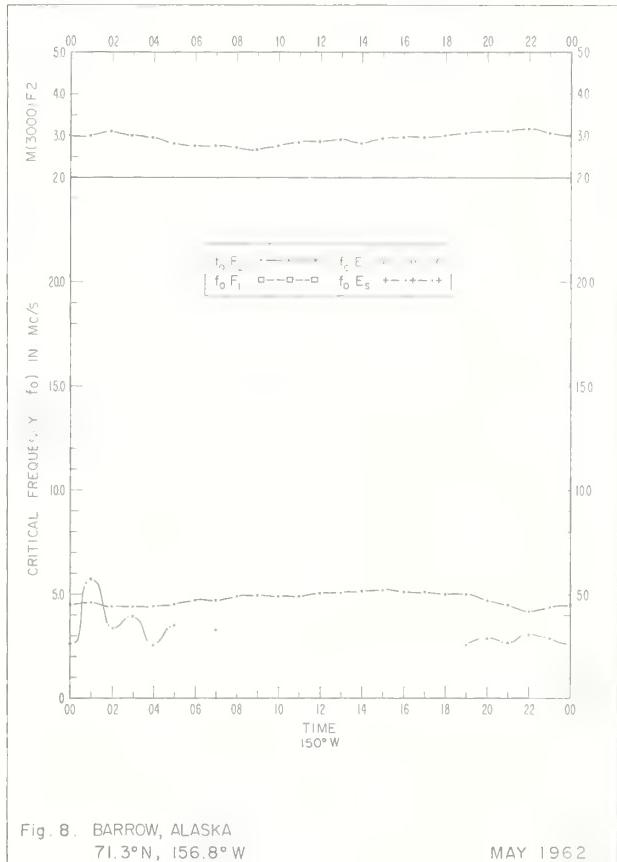
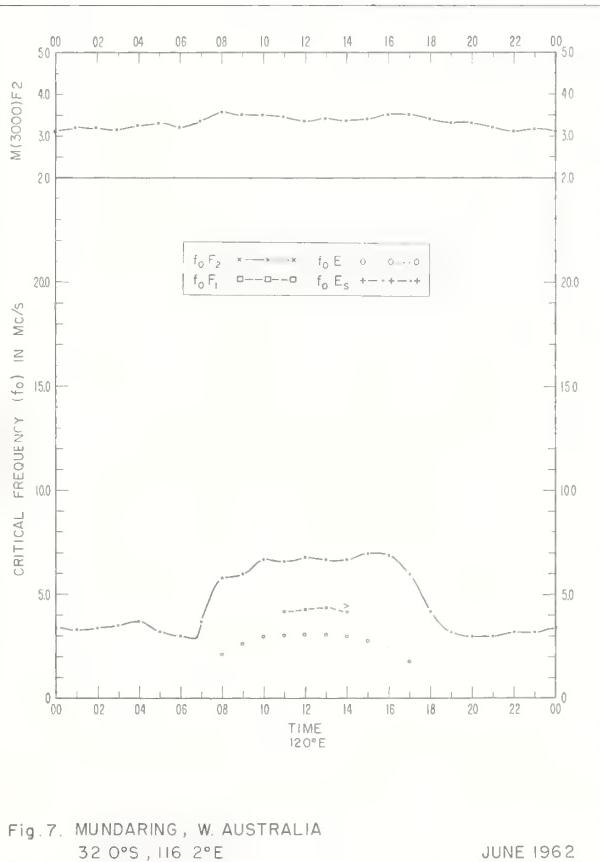
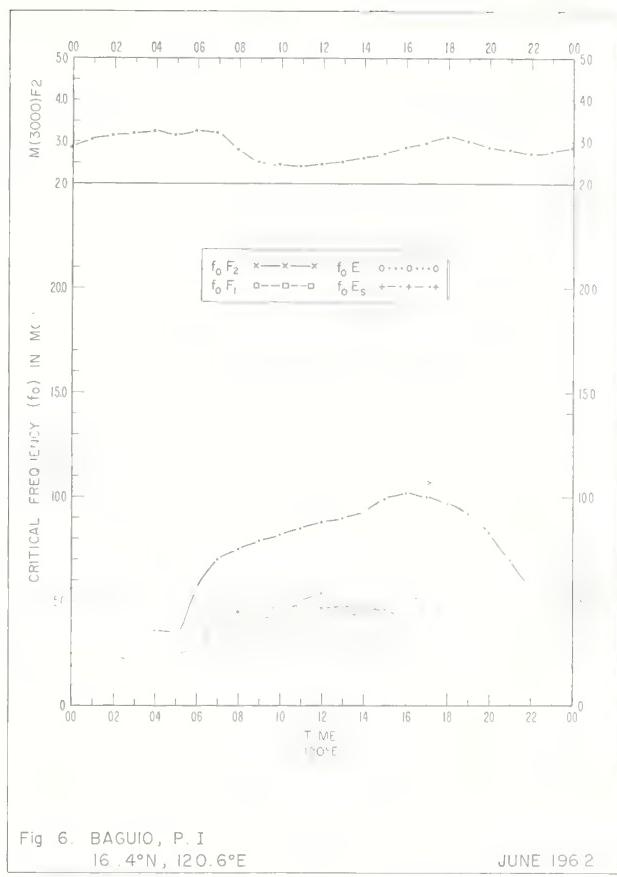
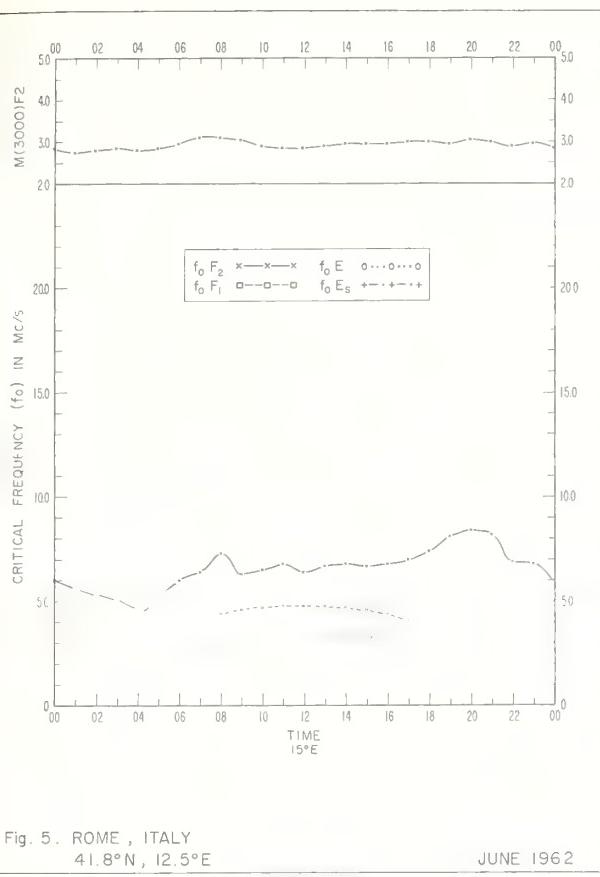
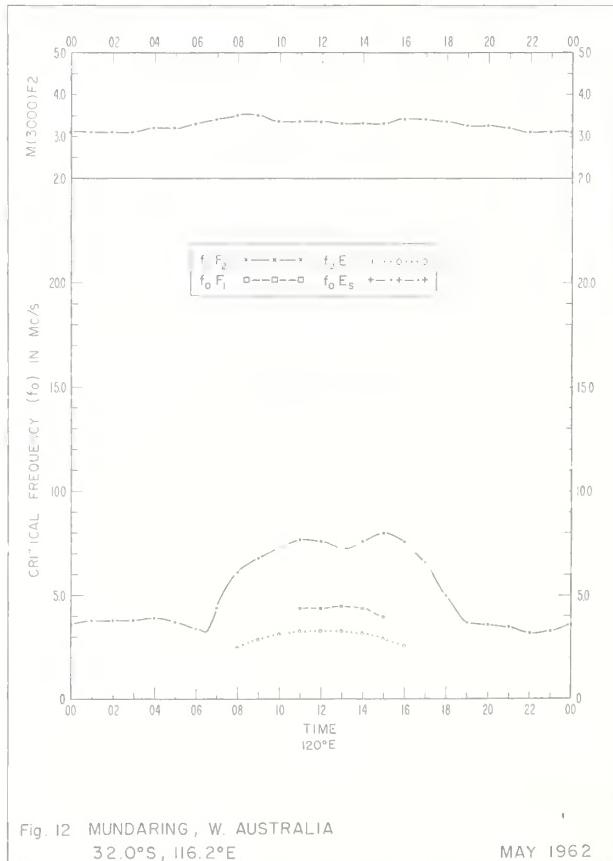
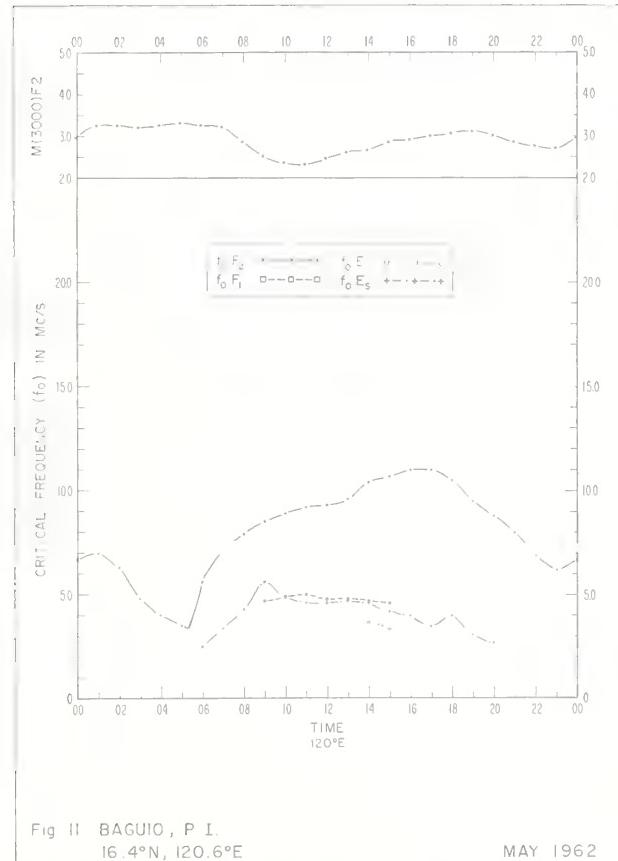
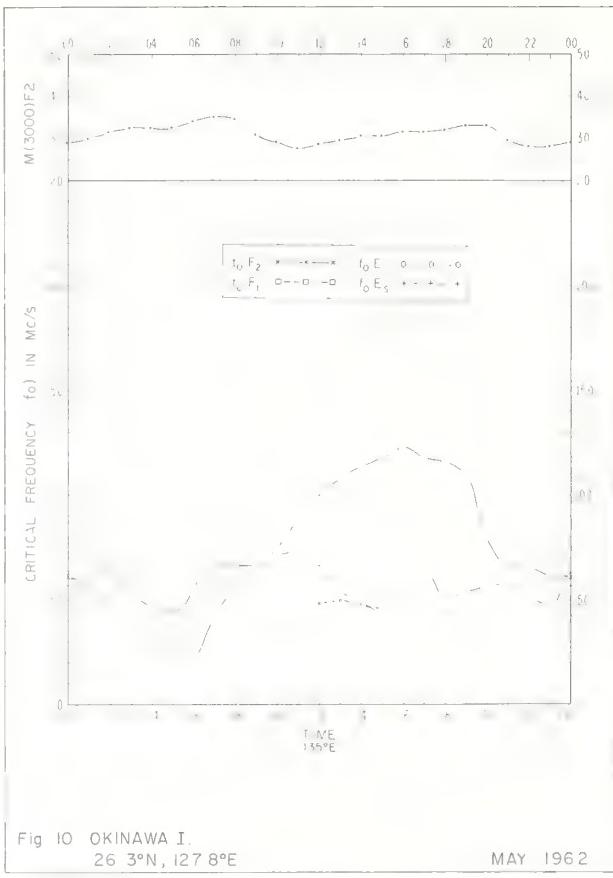
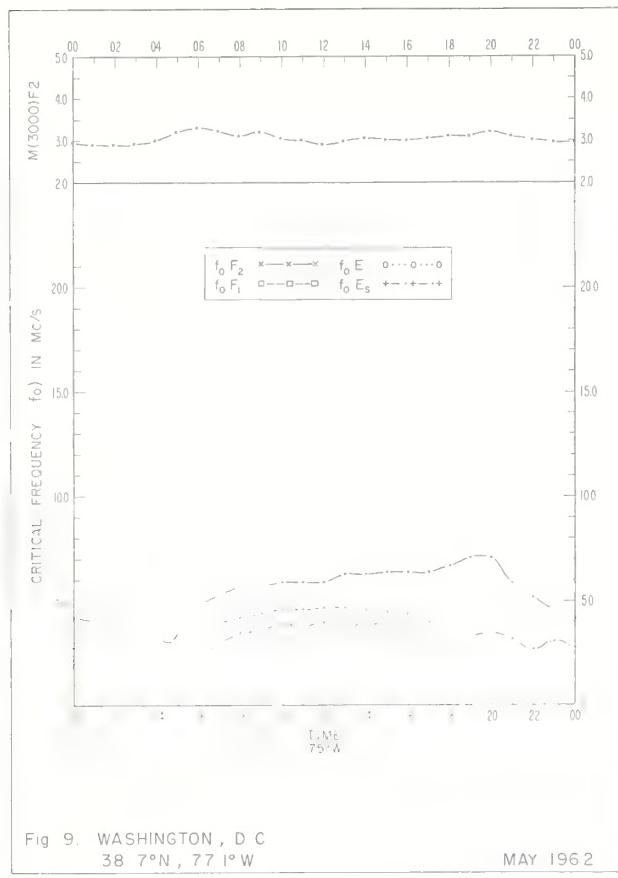
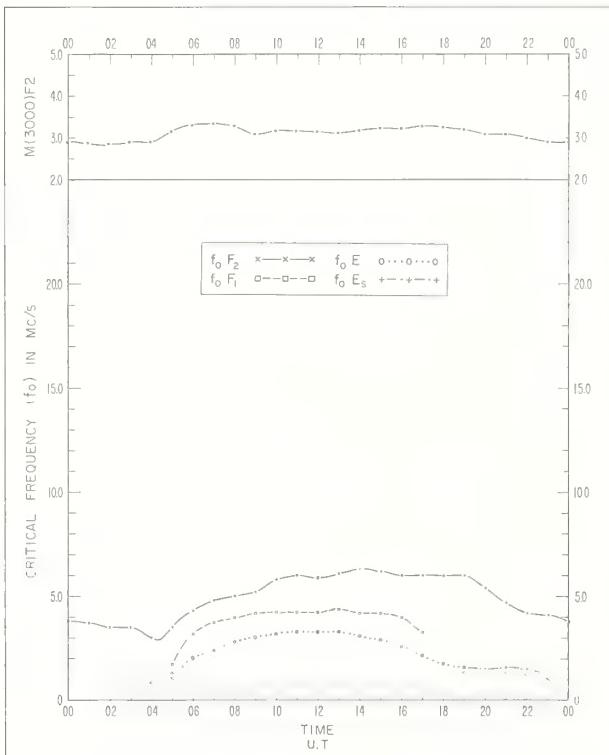
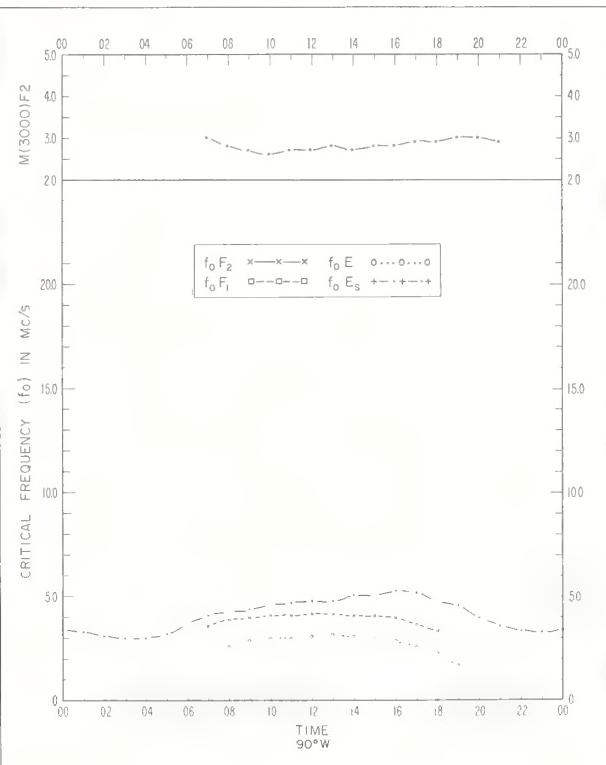
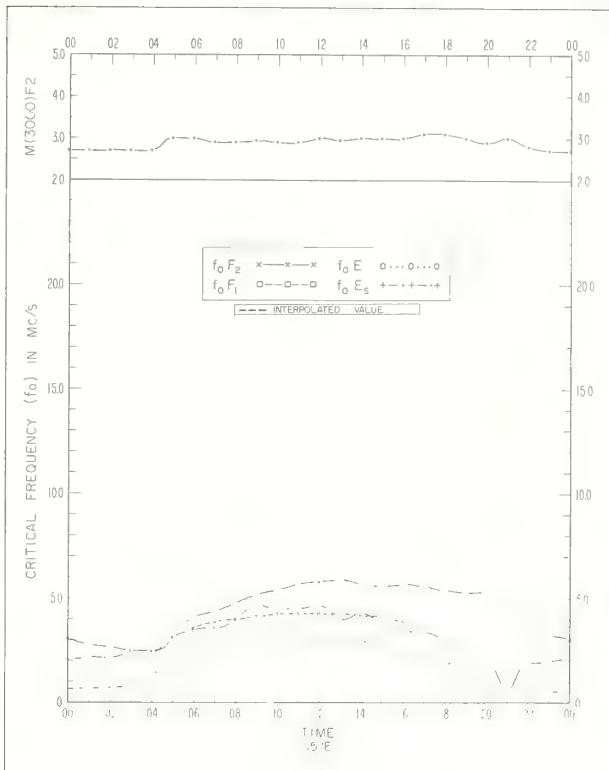
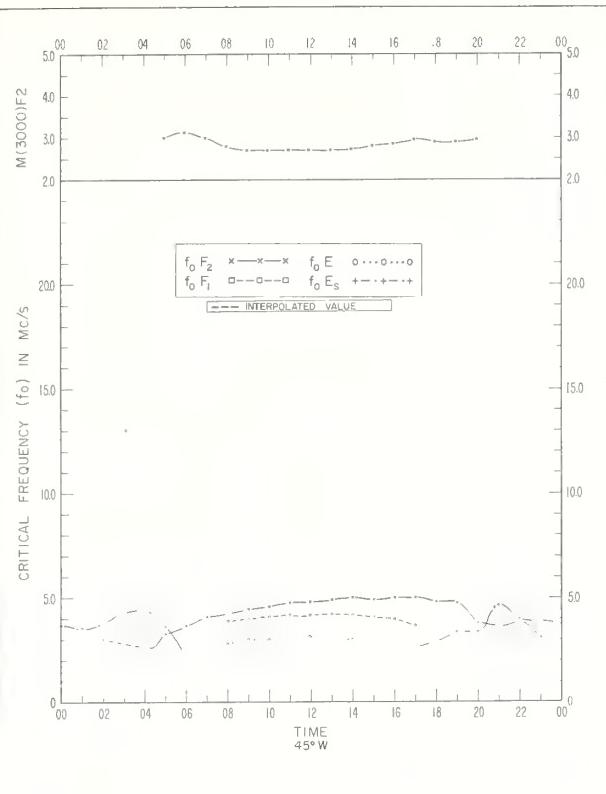


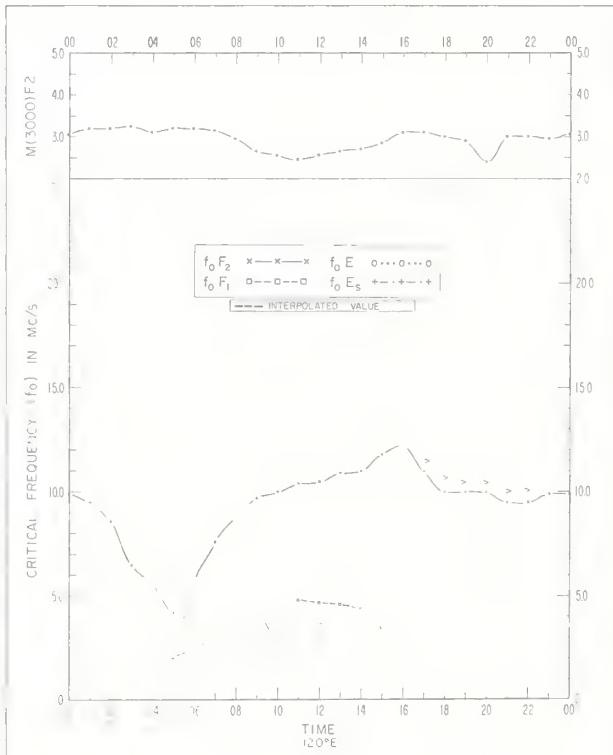
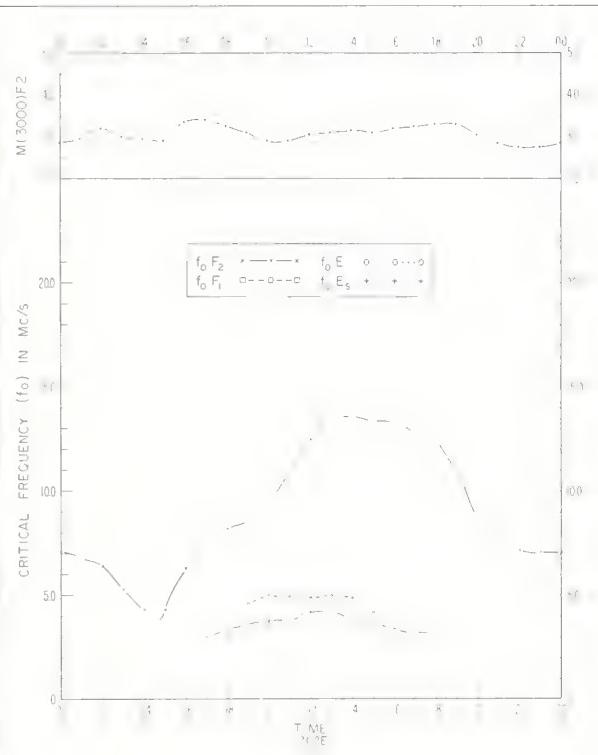
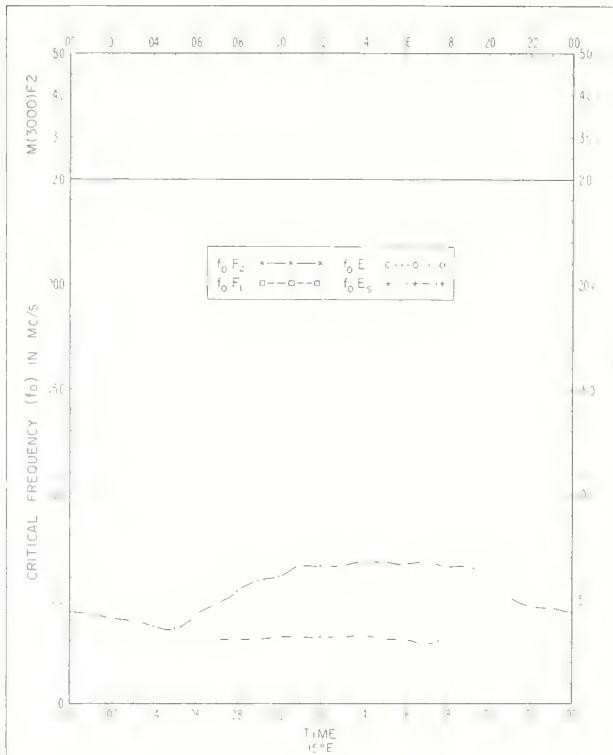
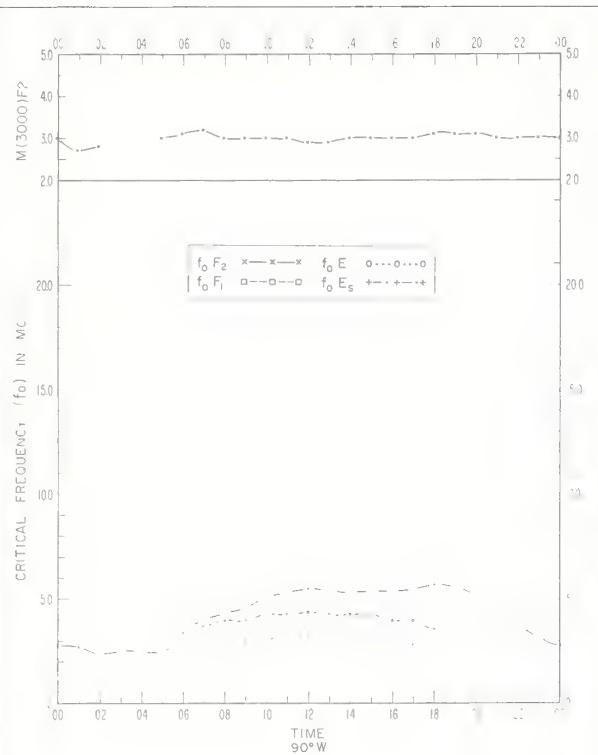
Fig. 4. ST. JOHN'S, NEWFOUNDLAND  
47.6°N, 52.7°W

JUNE 1962









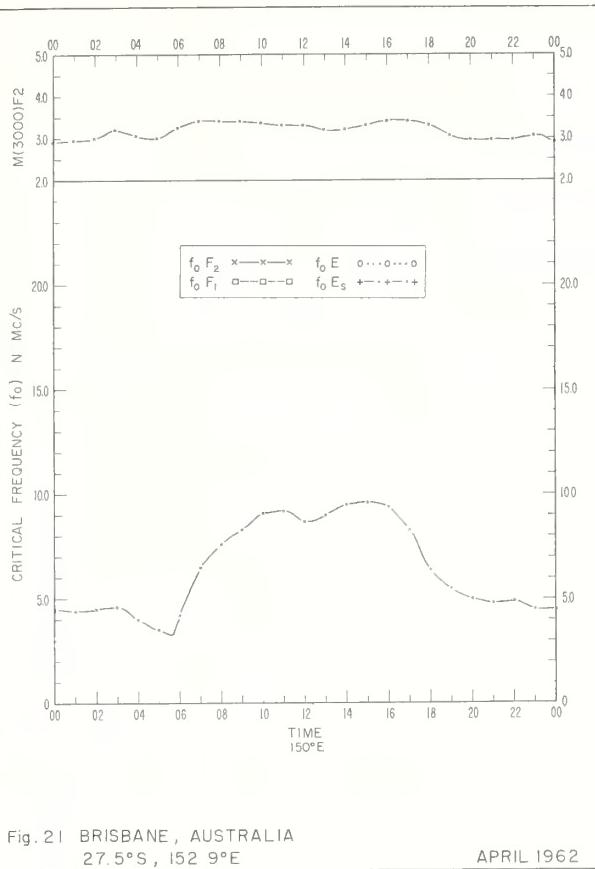


Fig. 21 BRISBANE, AUSTRALIA  
27.5°S, 152.9°E

APRIL 1962

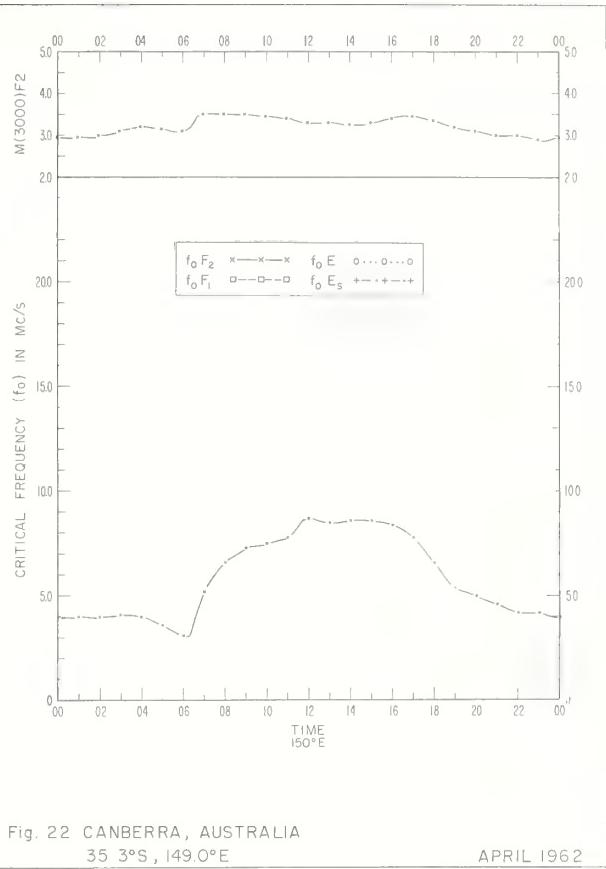


Fig. 22 CANBERRA, AUSTRALIA  
35.3°S, 149.0°E

APRIL 1962

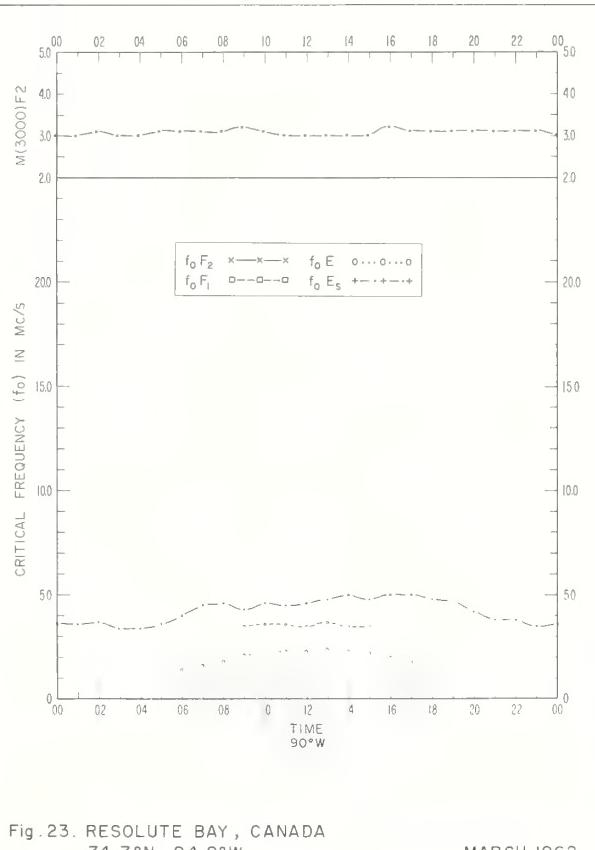


Fig. 23. RESOLUTE BAY, CANADA  
74.7°N, 94.9°W

MARCH 1962

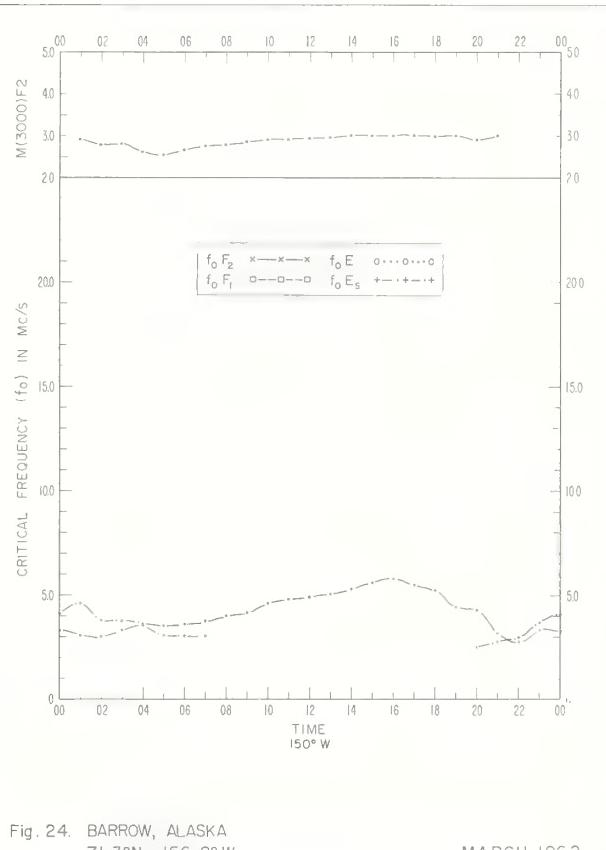
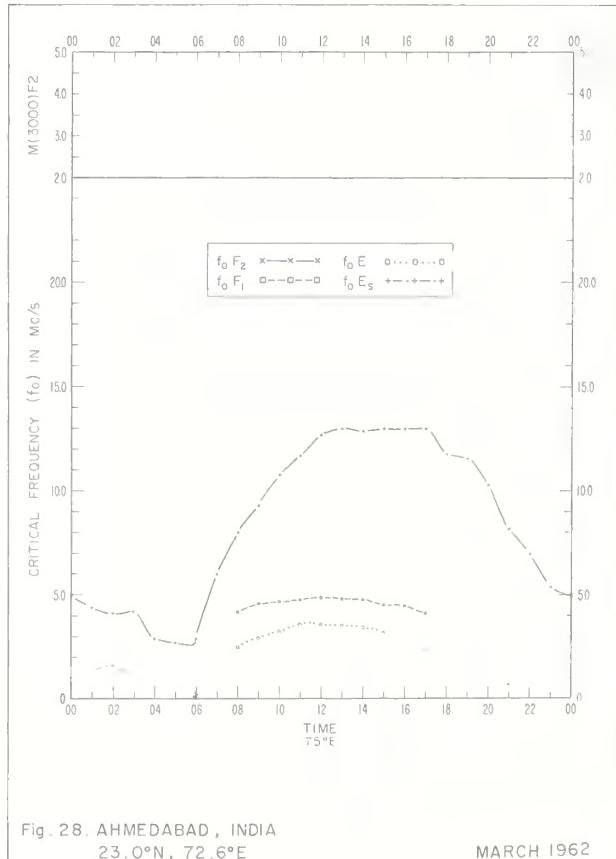
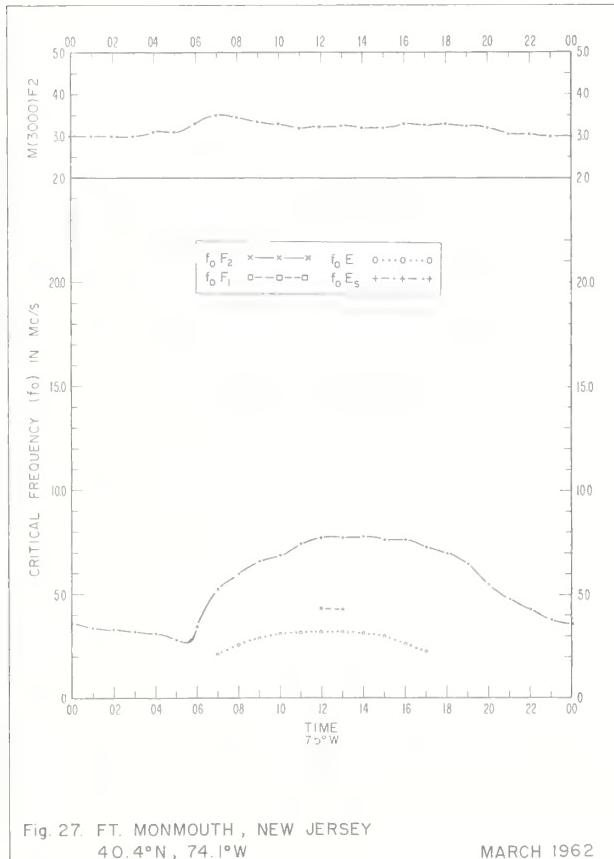
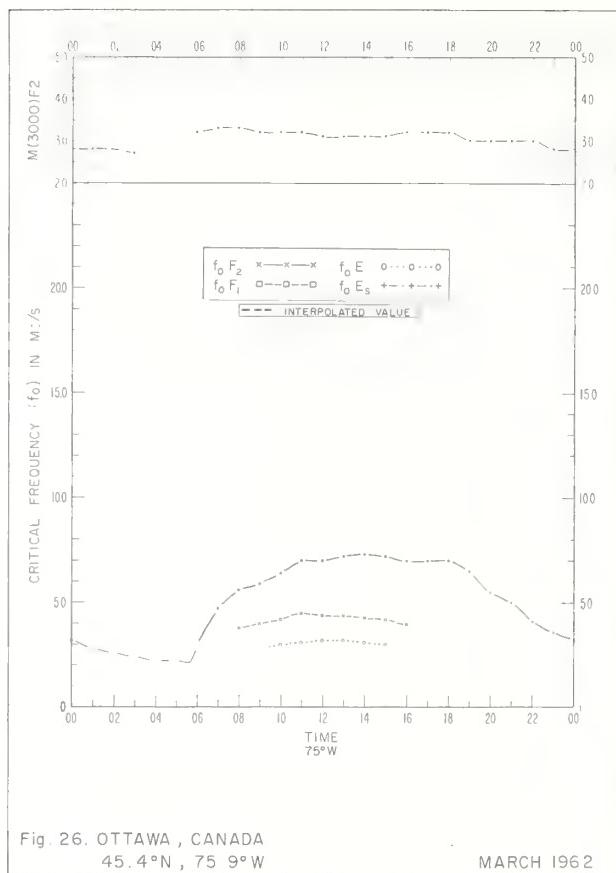
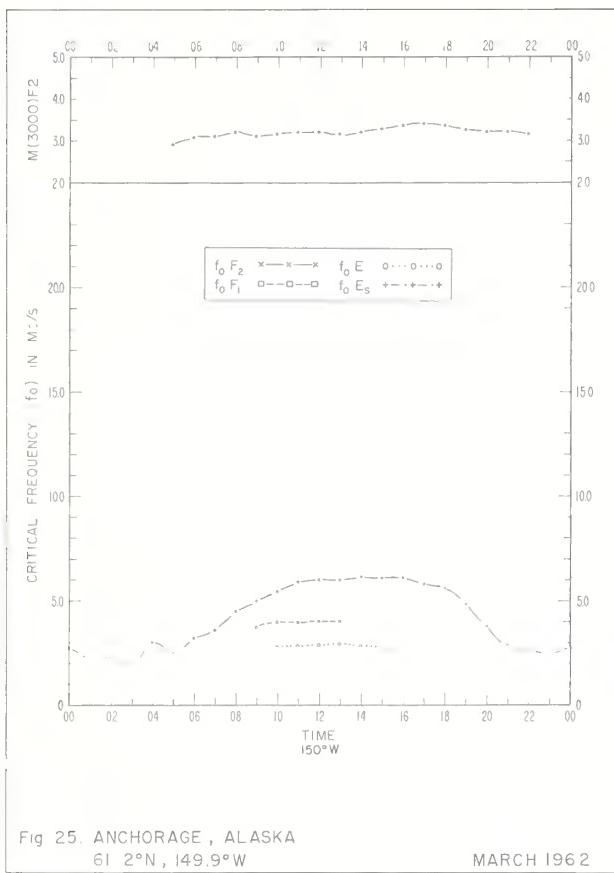
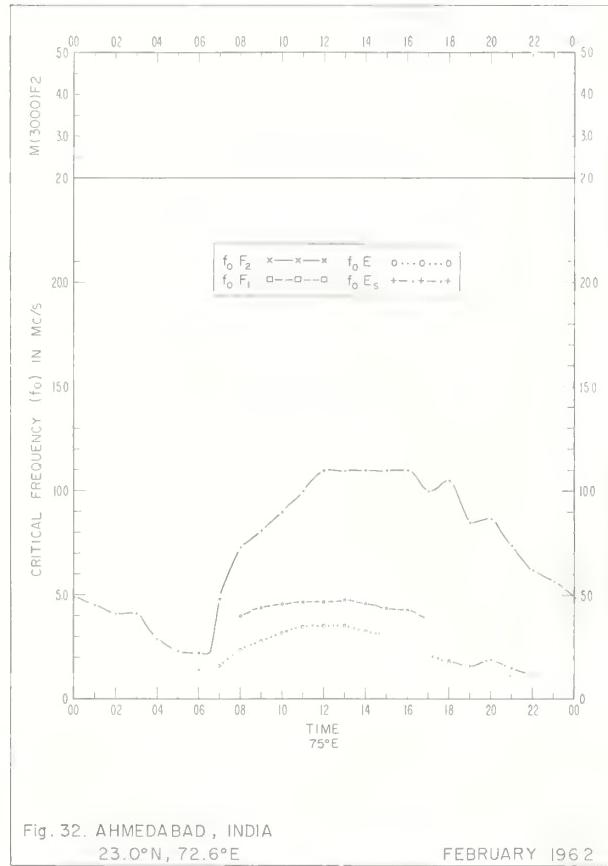
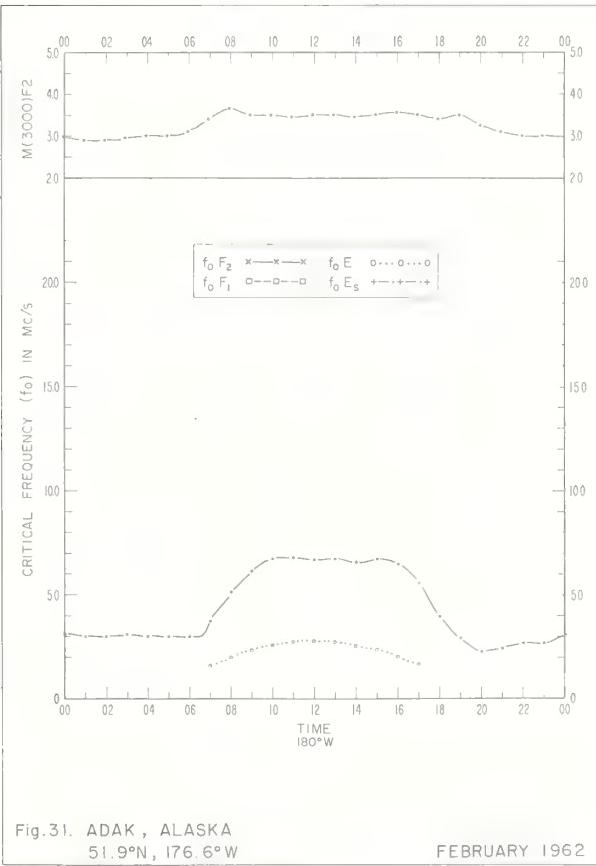
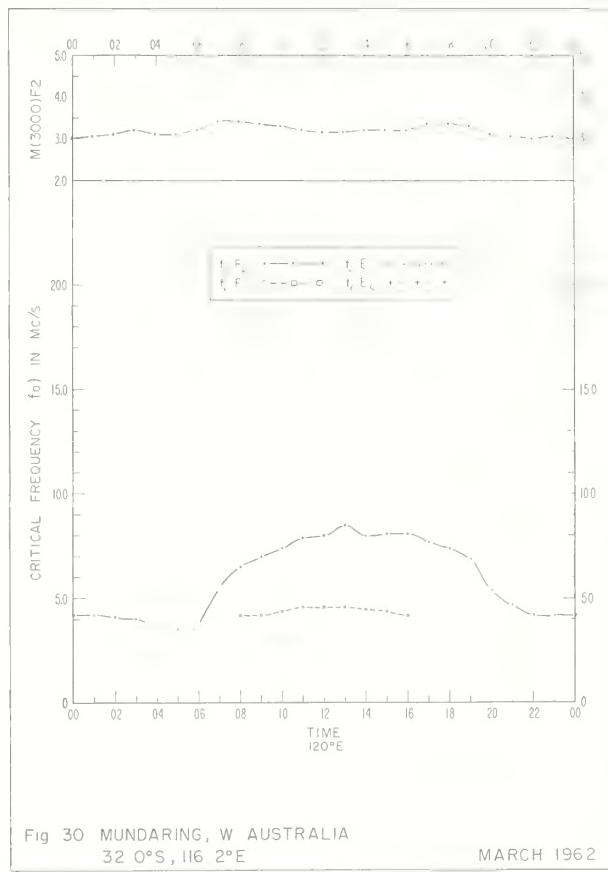
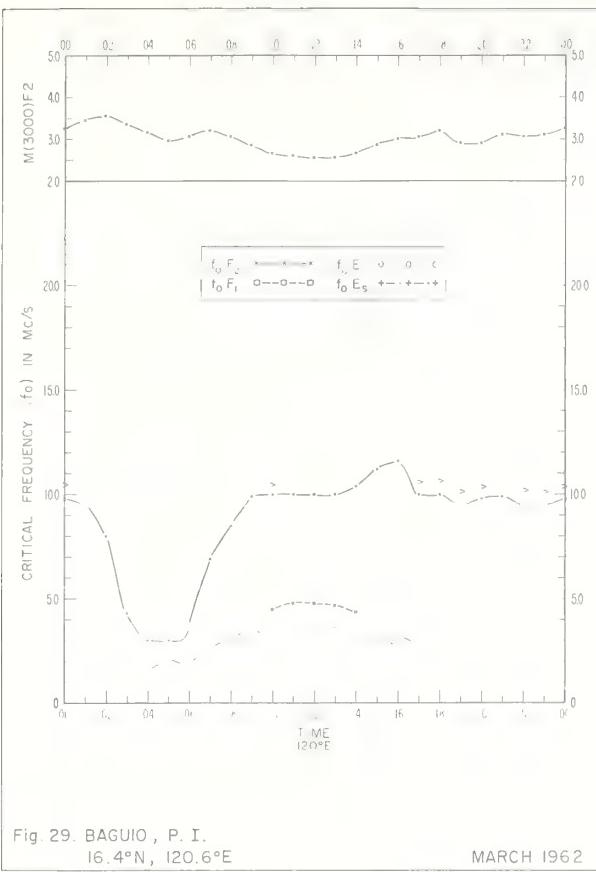


Fig. 24. BARROW, ALASKA  
71.3°N, 156.8°W

MARCH 1962





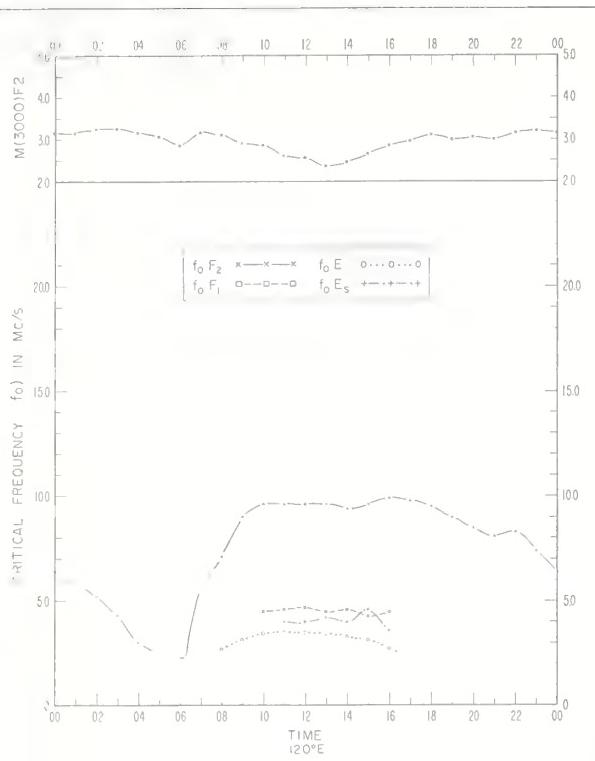


Fig. 33 BAGUIO, P.I.  
16.4°N, 120.6°E  
FEBRUARY 1962

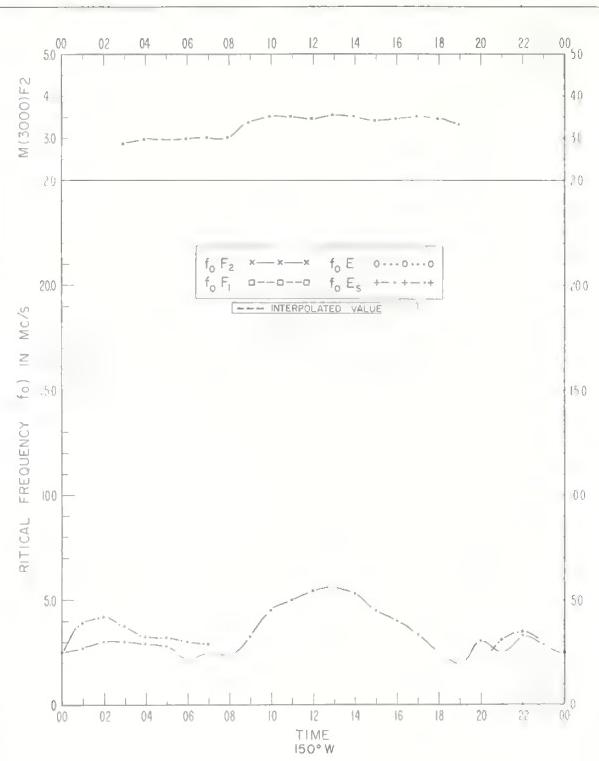


Fig. 34 FAIRBANKS, ALASKA  
64.9°N, 147.8°W  
JANUARY 1962

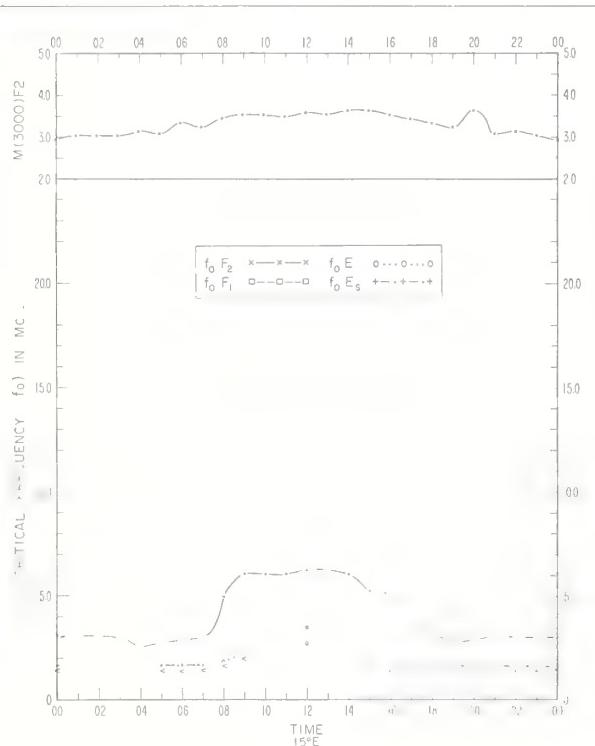


Fig. 35 WARSAW, POLAND  
52.1°N, 21.2°E  
JANUARY 1962

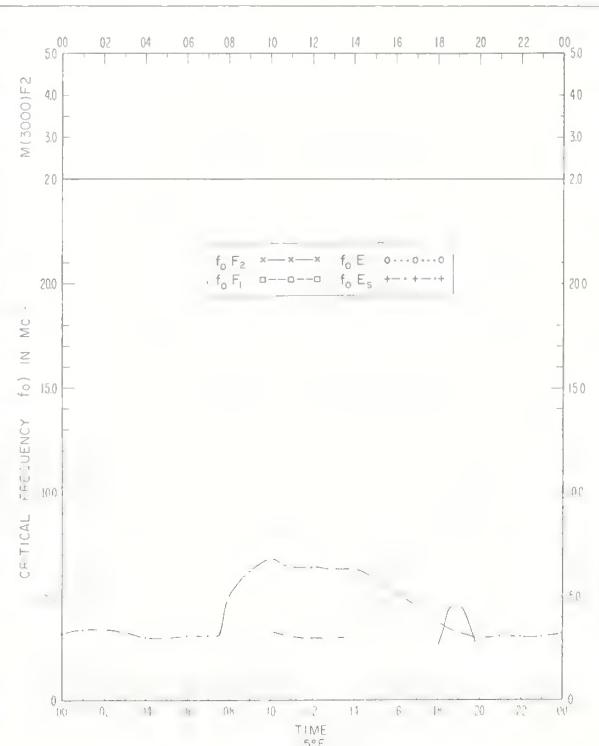
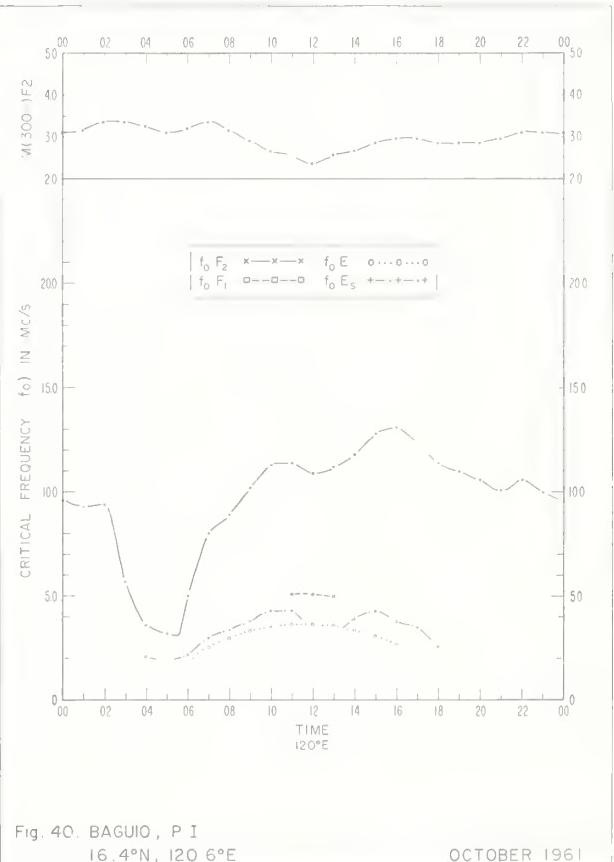
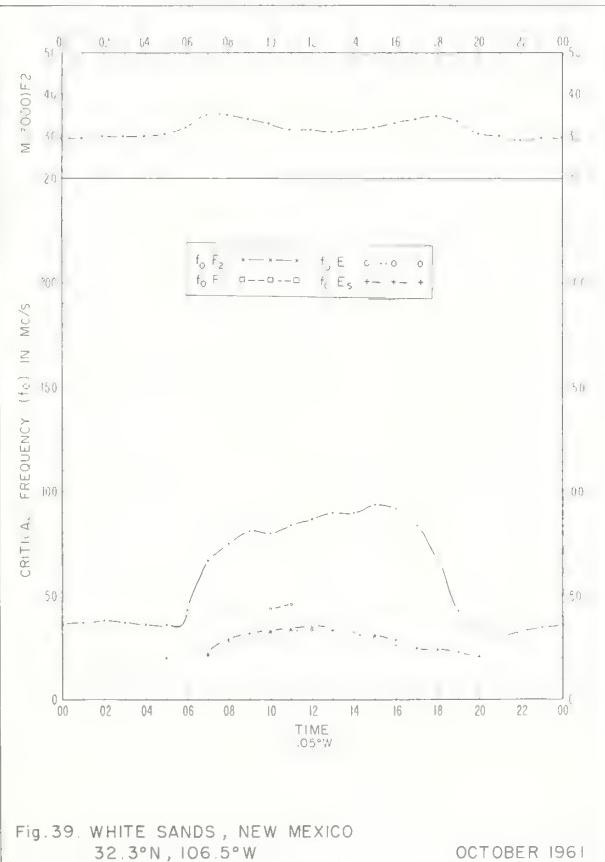
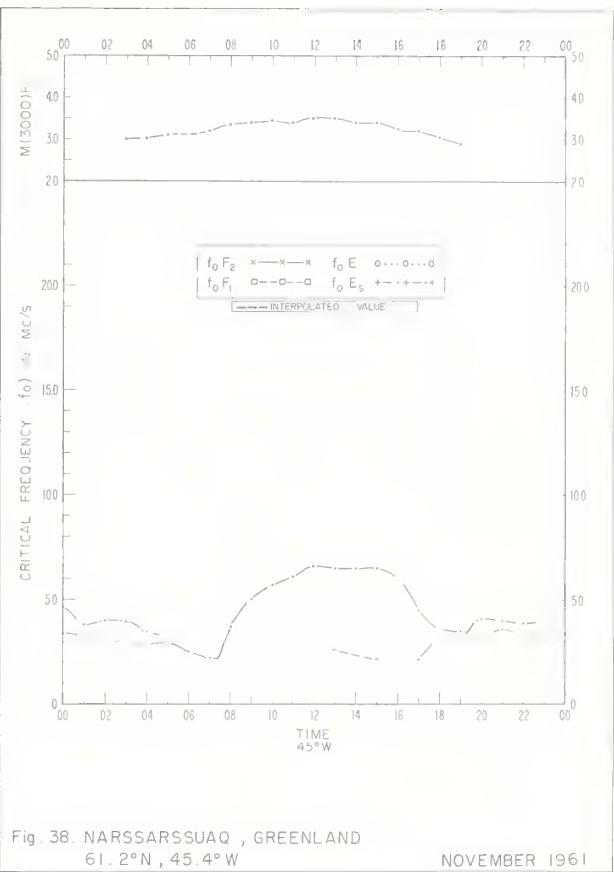
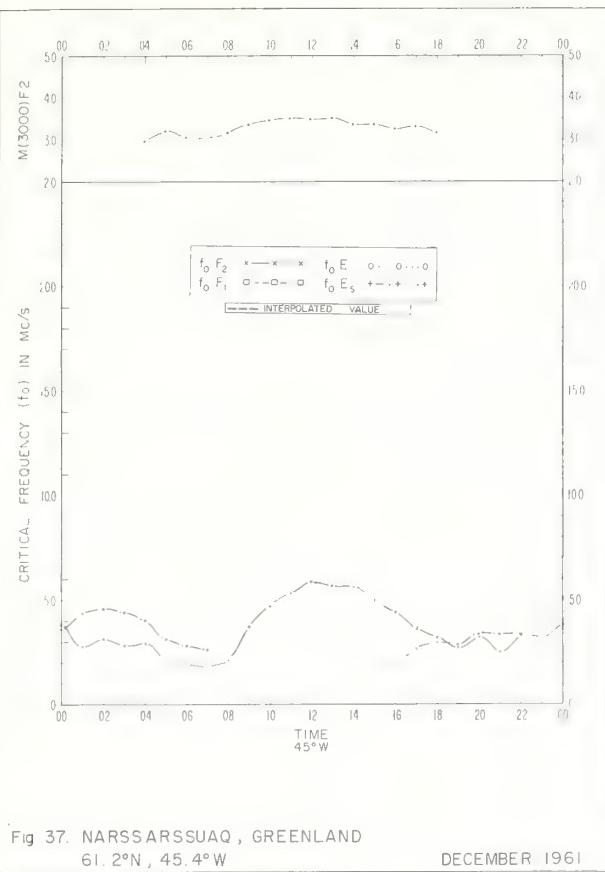
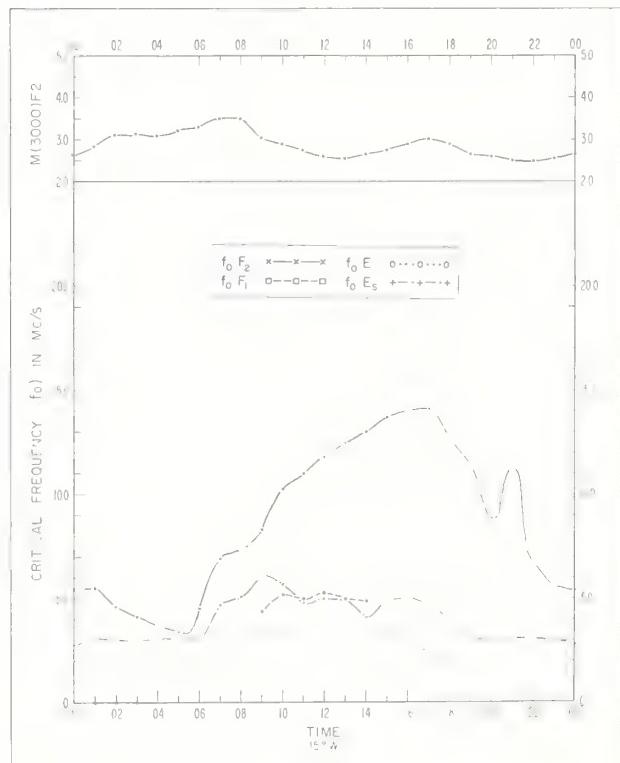
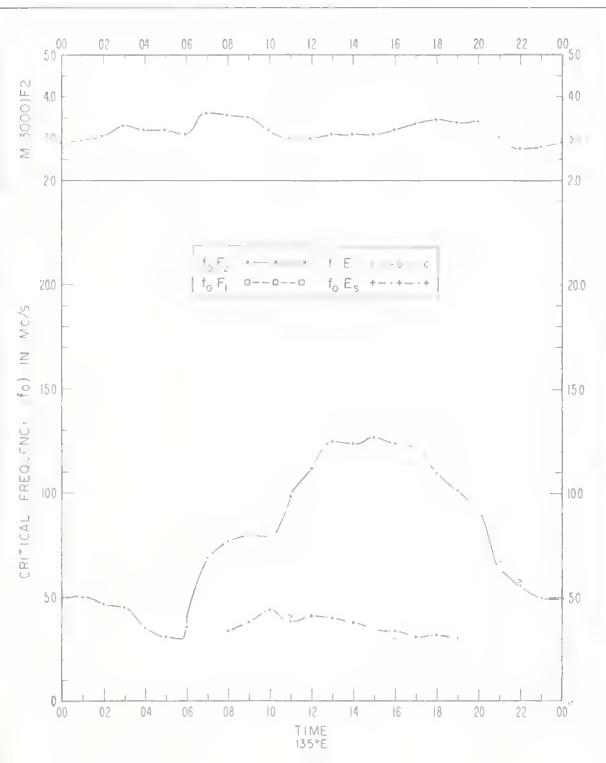
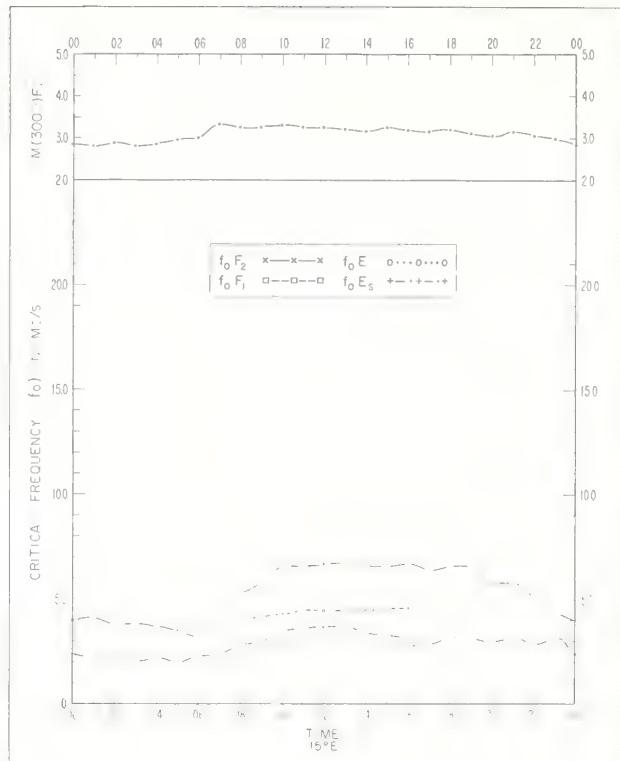
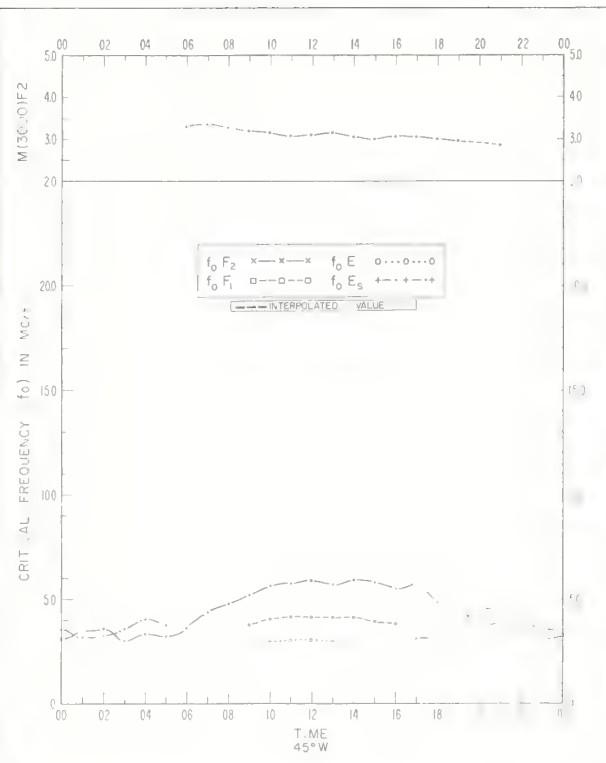
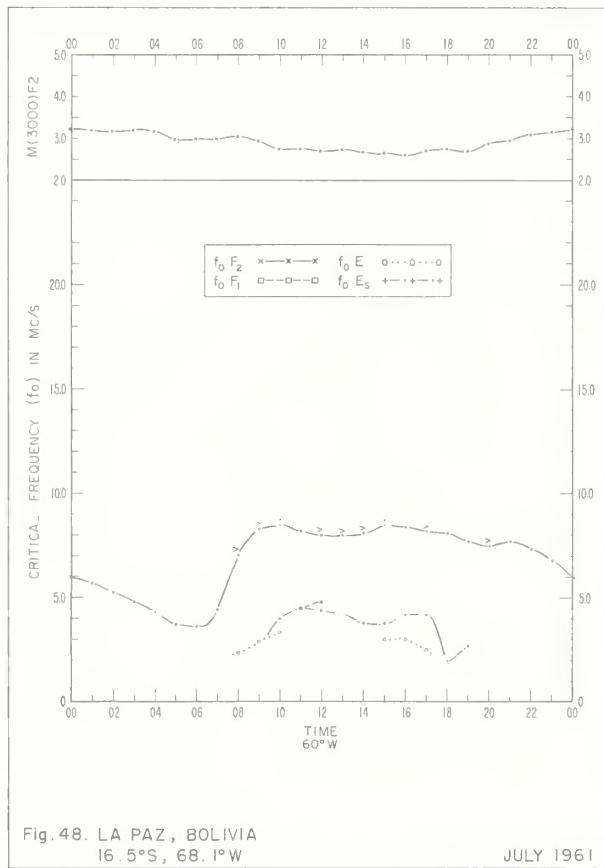
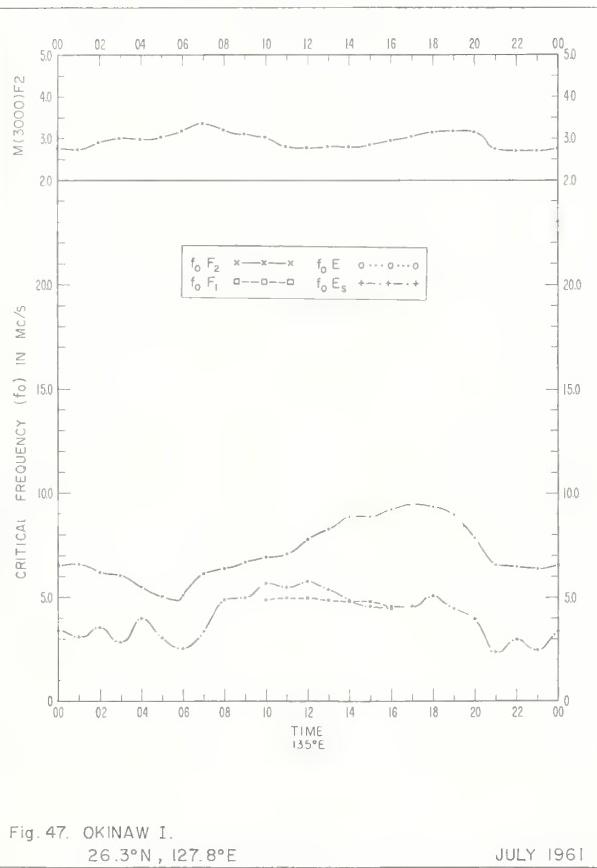
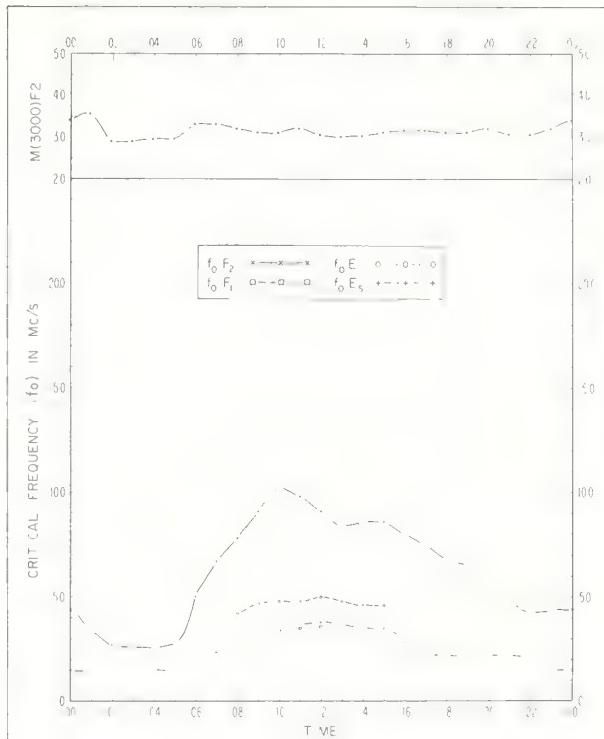
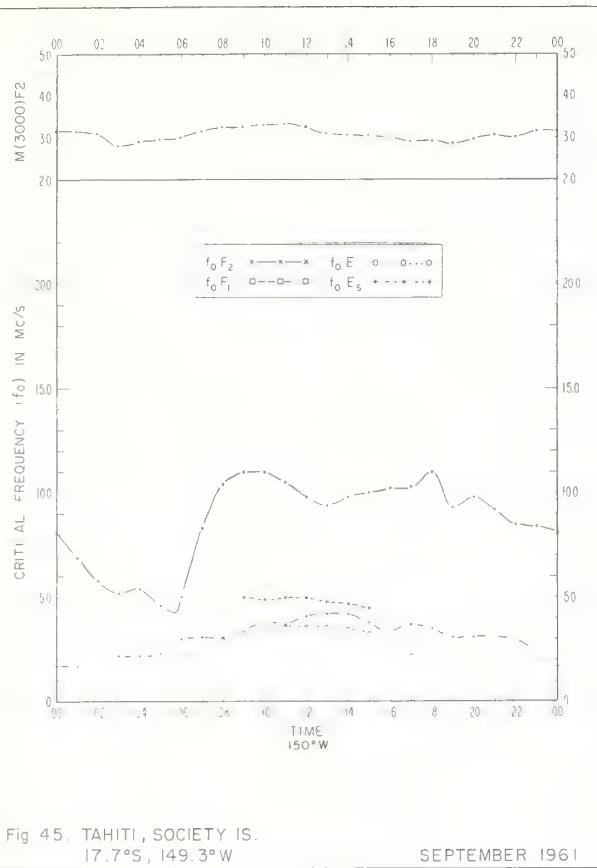
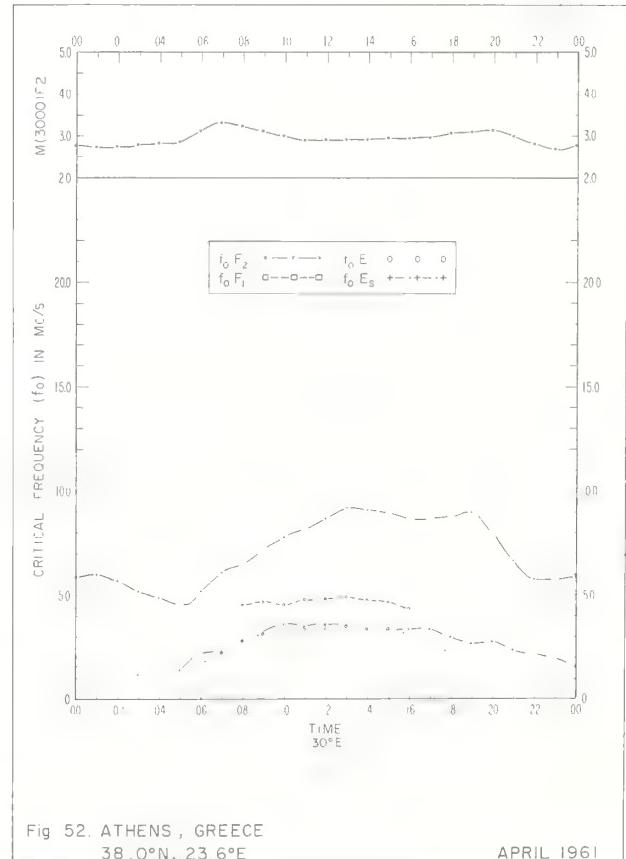
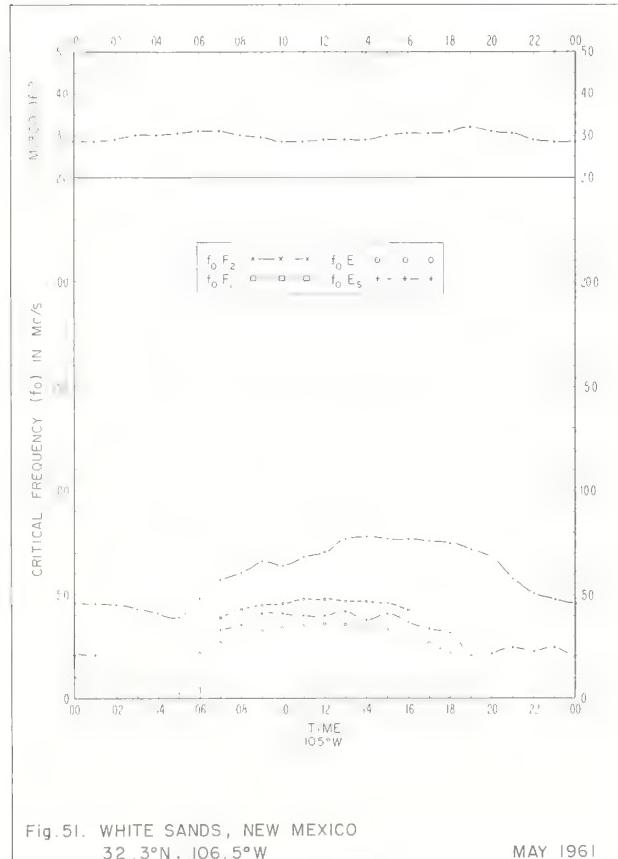
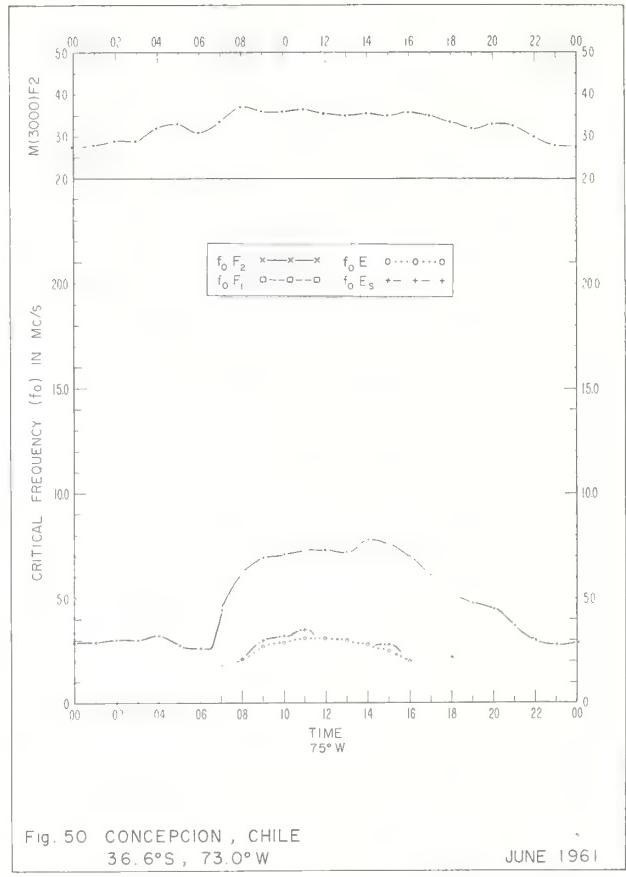
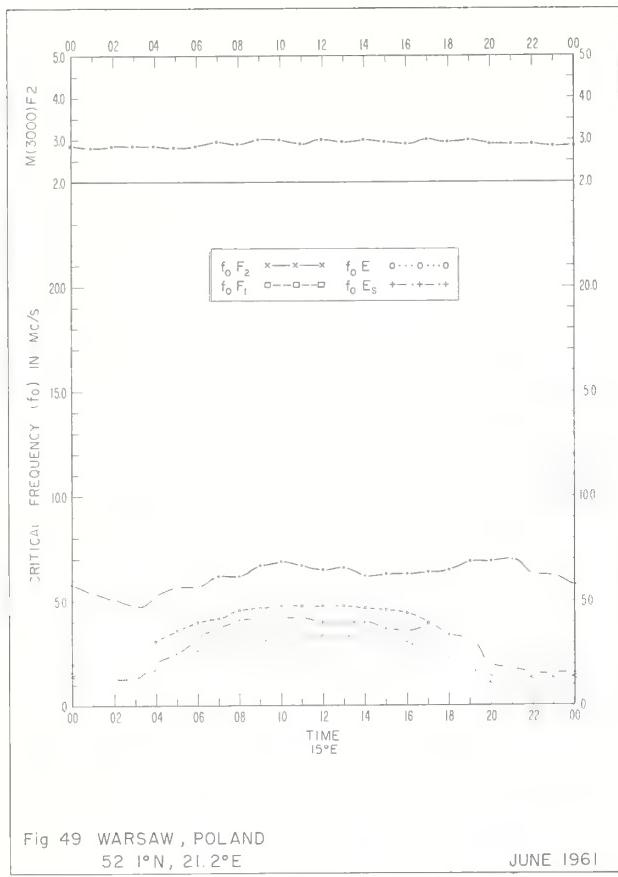


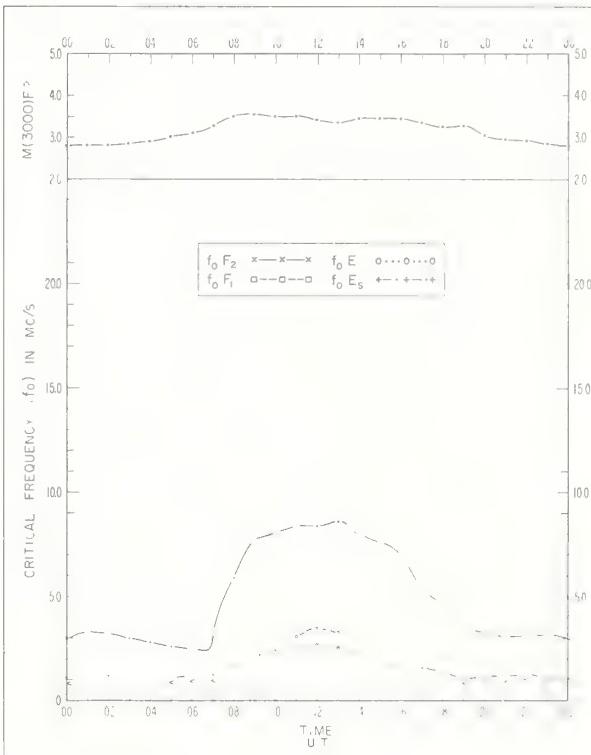
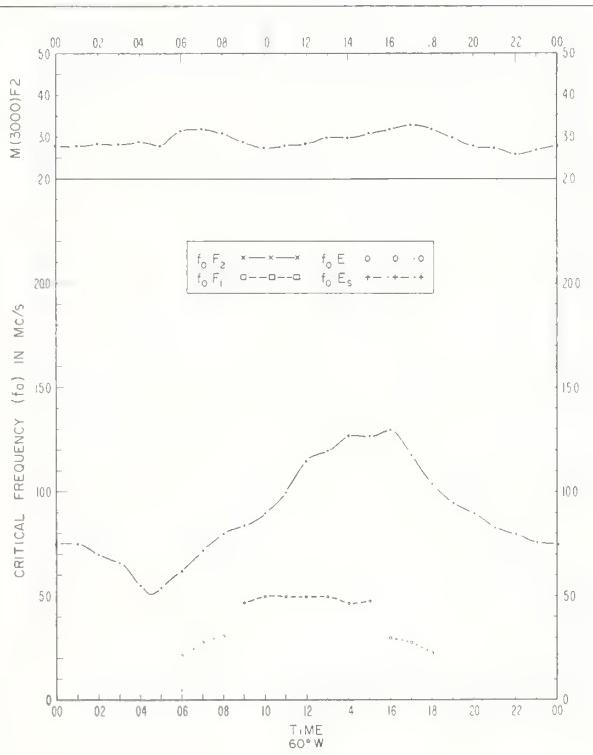
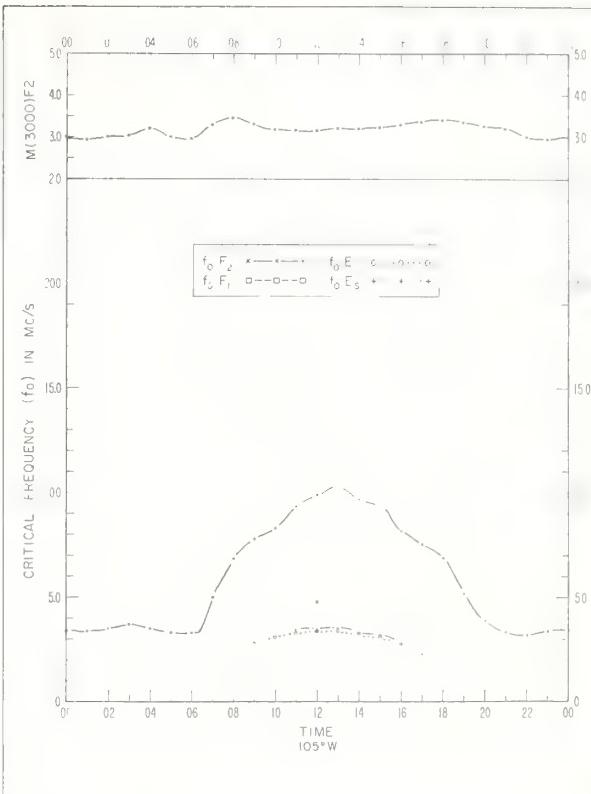
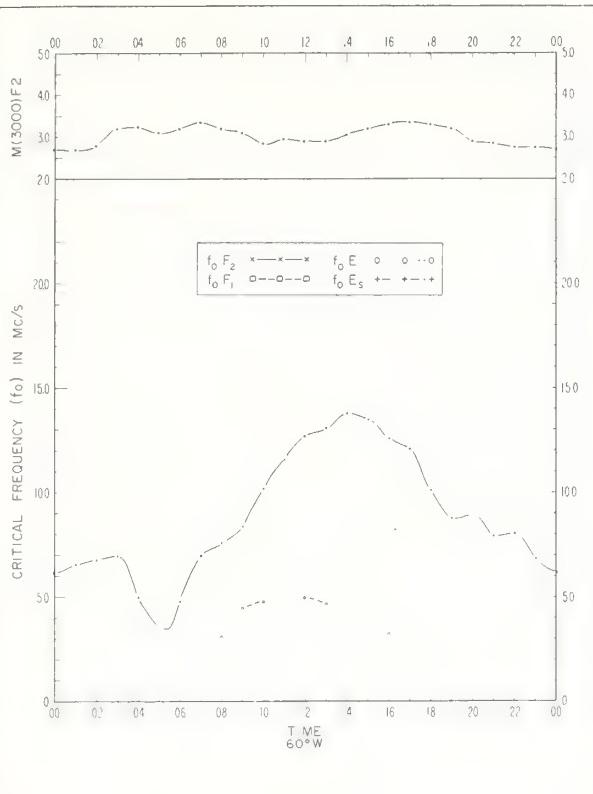
Fig. 36 GRAZ, AUSTRIA  
47.1°N, 15.5°E  
JANUARY 1962











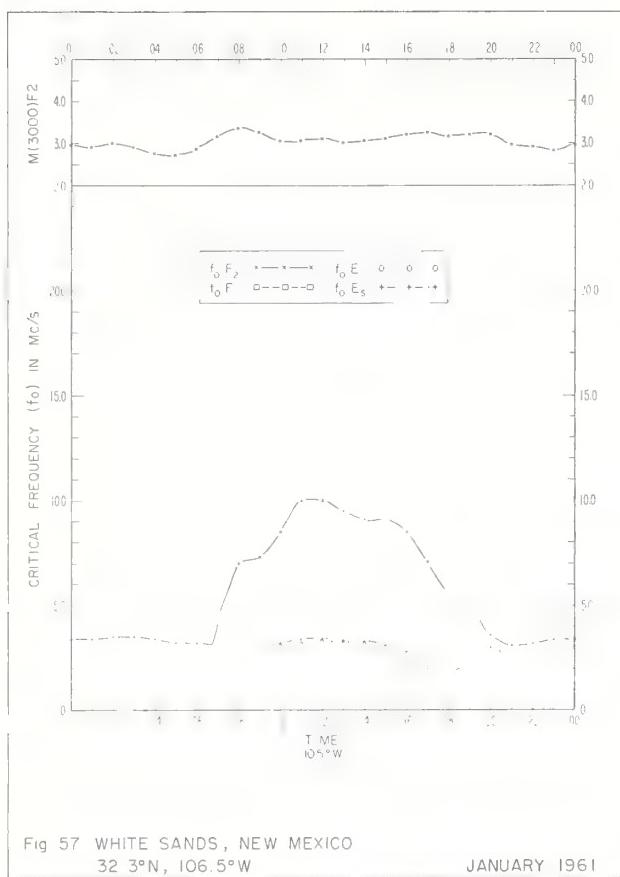


Fig 57 WHITE SANDS, NEW MEXICO  
32 3°N, 106.5°W

JANUARY 1961

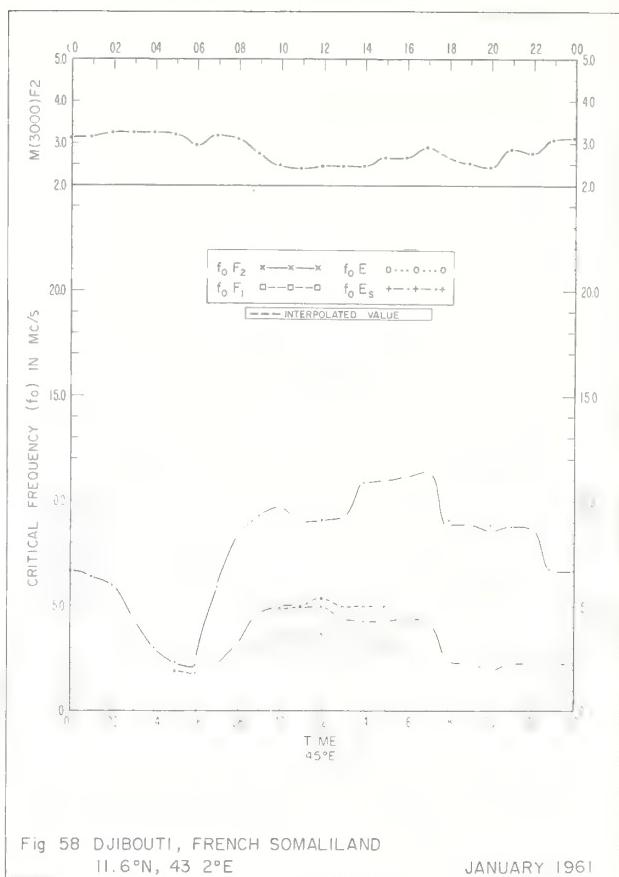


Fig 58 DJIBOUTI, FRENCH SOMALILAND  
11.6°N, 43 2°E

JANUARY 1961

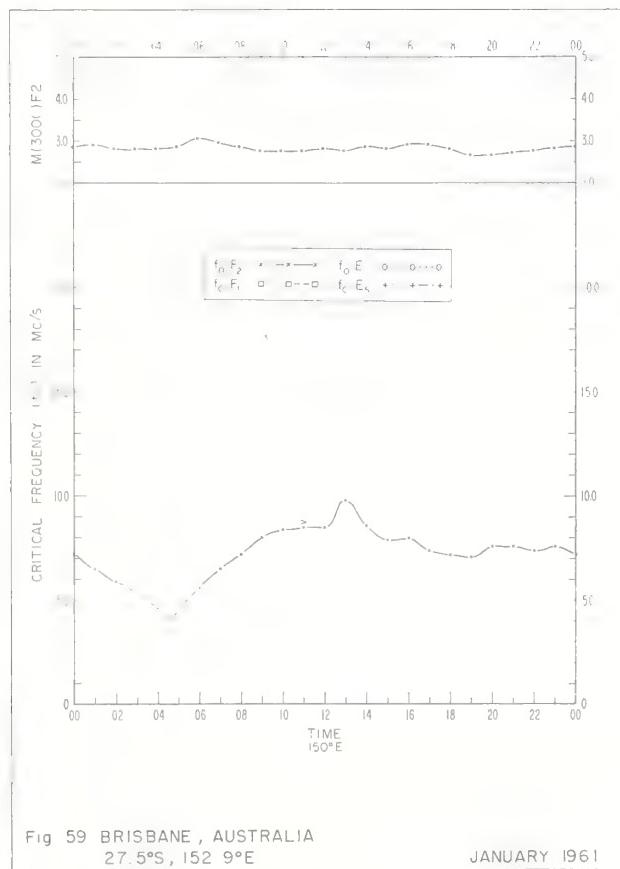


Fig 59 BRISBANE, AUSTRALIA  
27.5°S, 152.9°E

JANUARY 1961

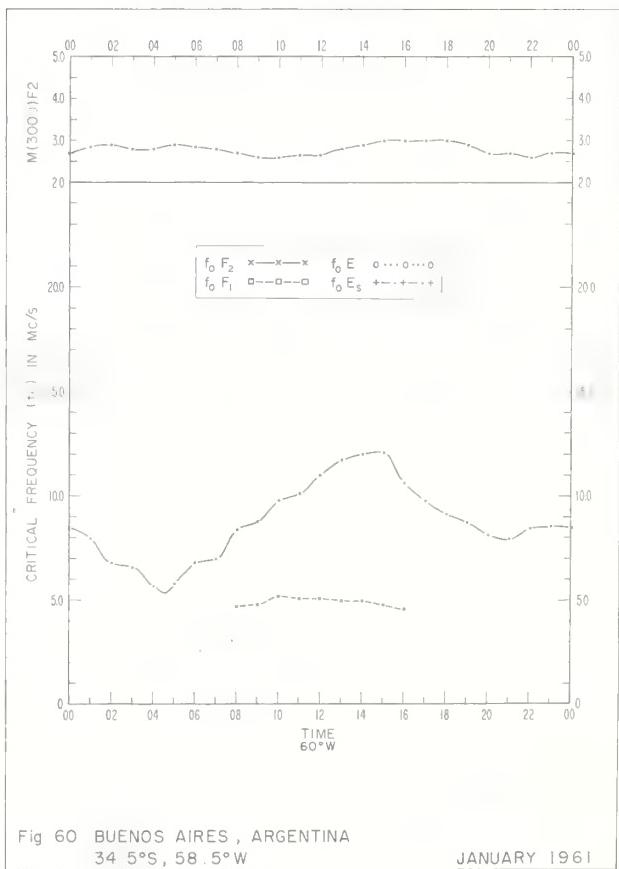
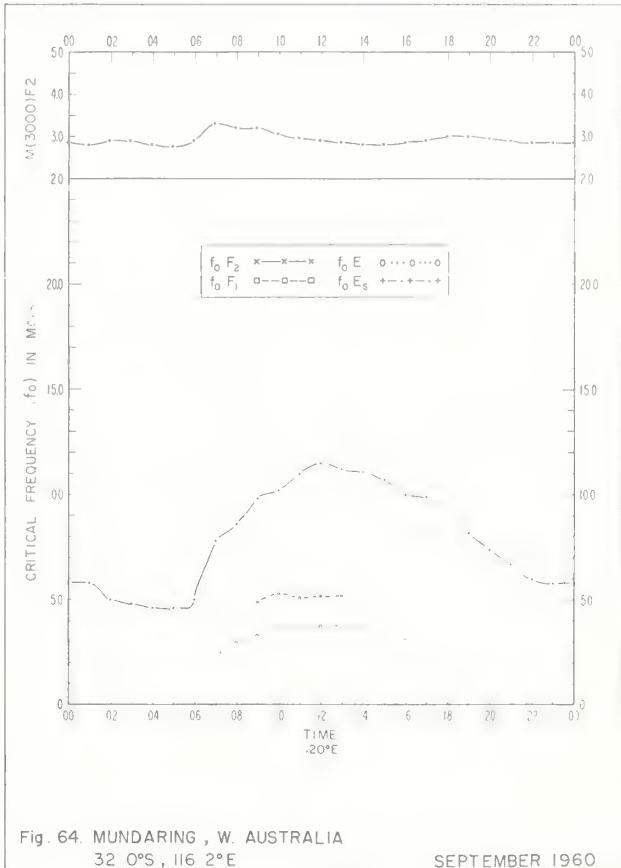
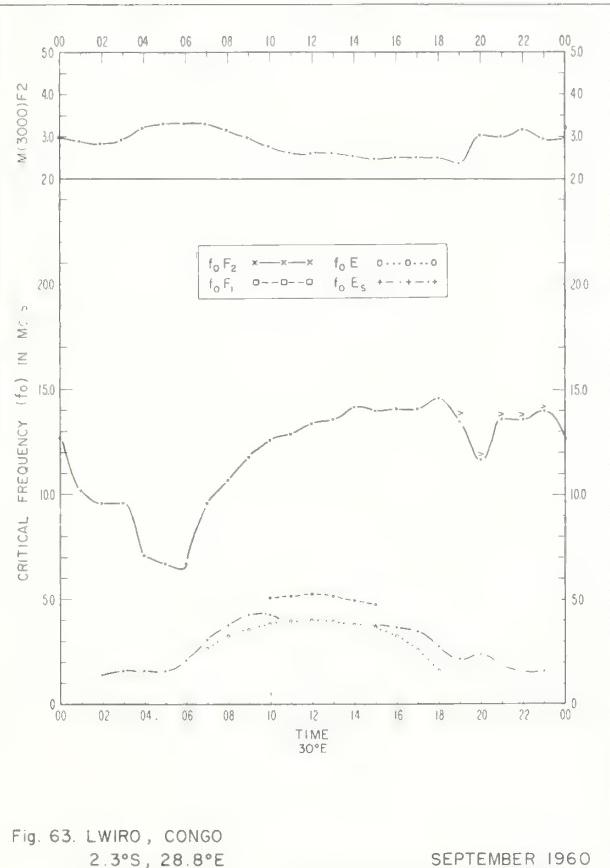
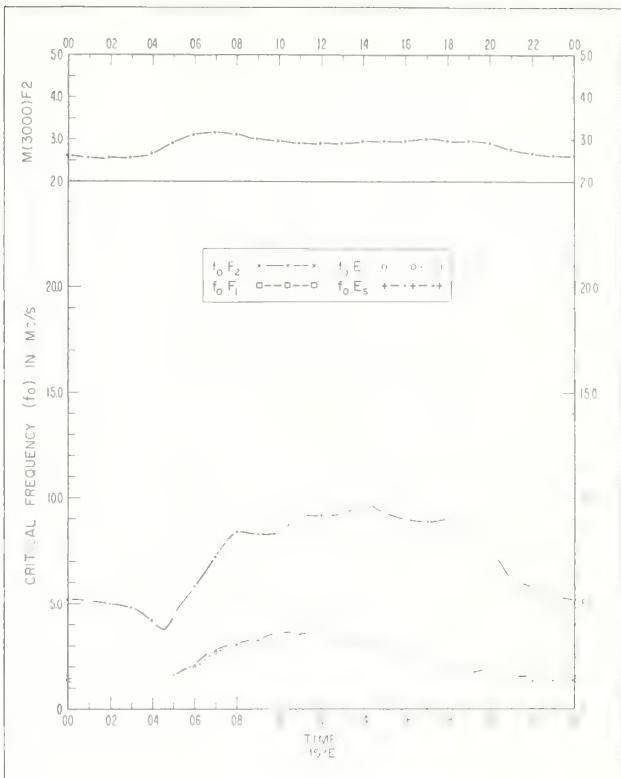
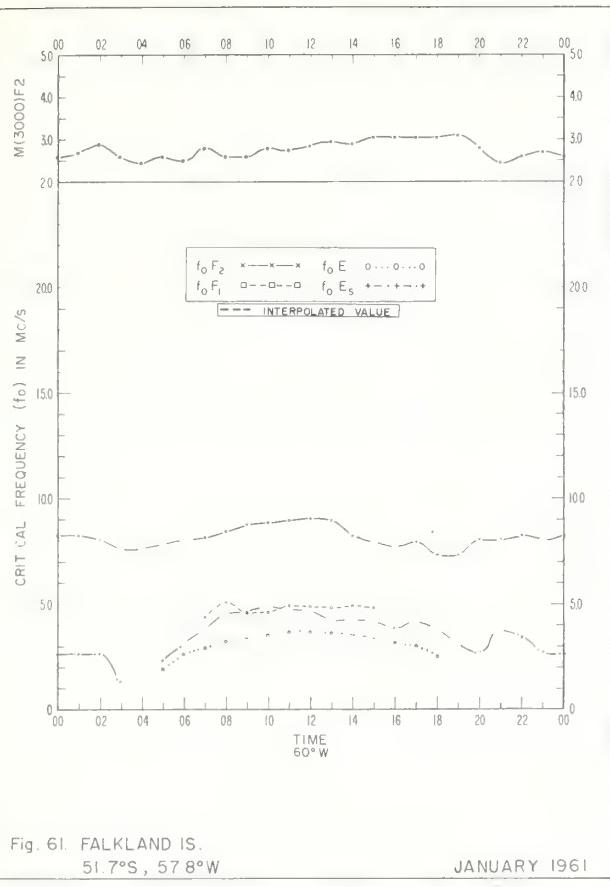


Fig 60 BUENOS AIRES, ARGENTINA  
34 5°S, 58.5°W

JANUARY 1961



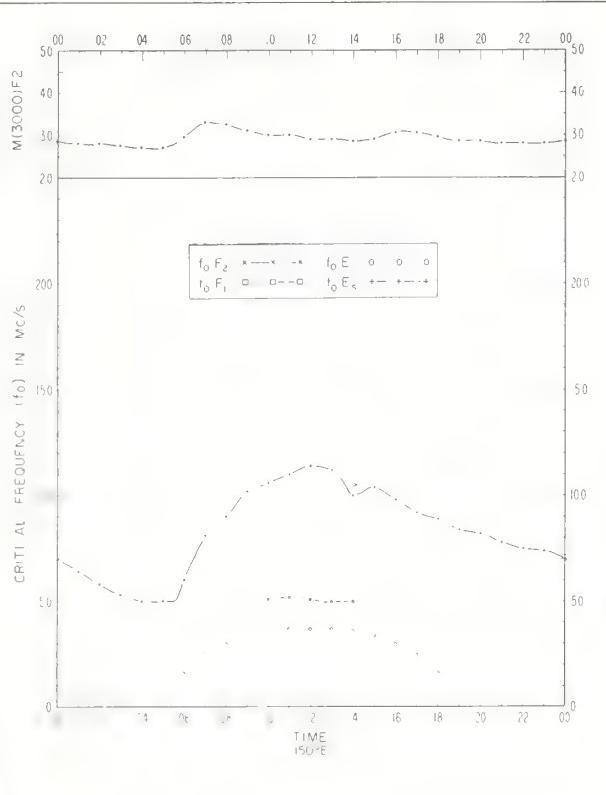


Fig 65 CANBERRA, AUSTRALIA  
35.3°S, 149.0°E SEPTEMBER 1960

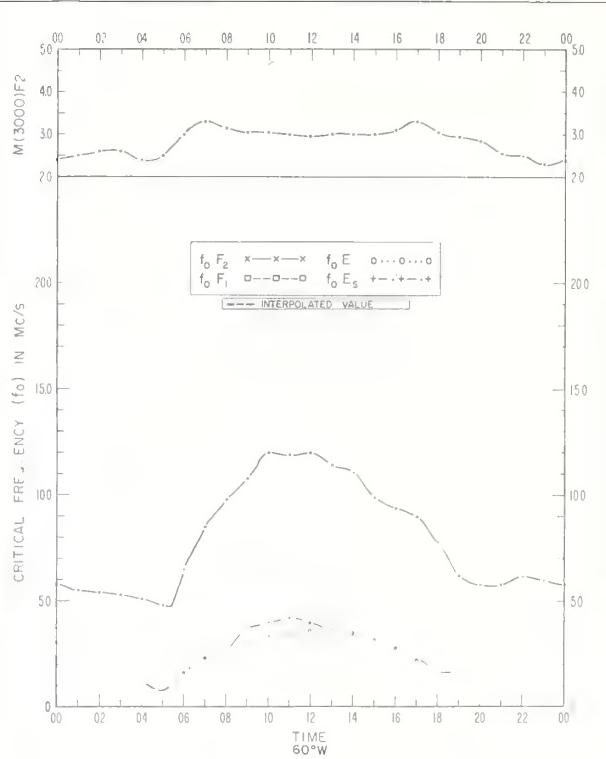


Fig. 66 FALKLAND IS  
51.7°S, 57.8°W SEPTEMBER 1960

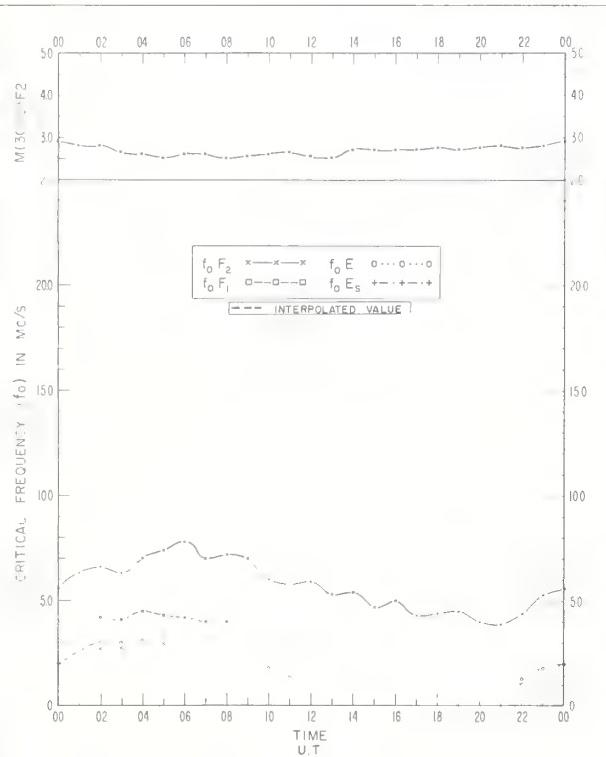


Fig. 67 WILKES STATION  
66.3°S, 110.5°E SEPTEMBER 1960

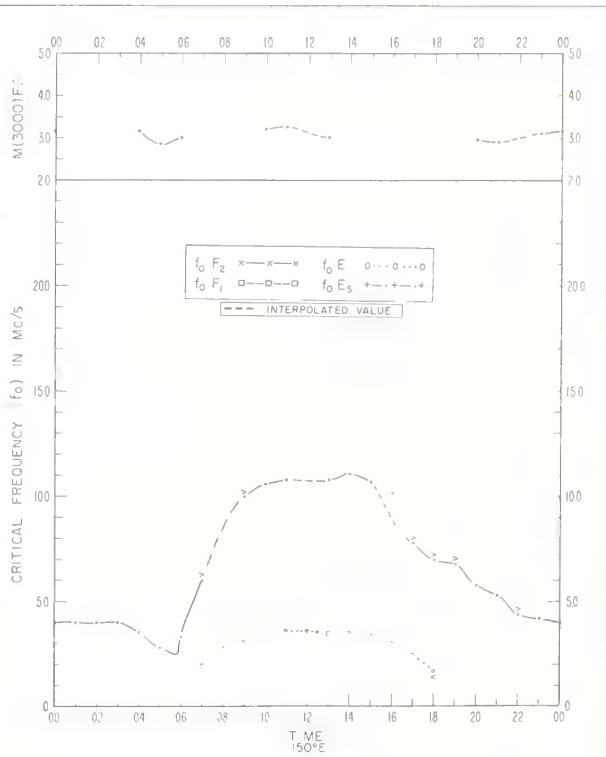
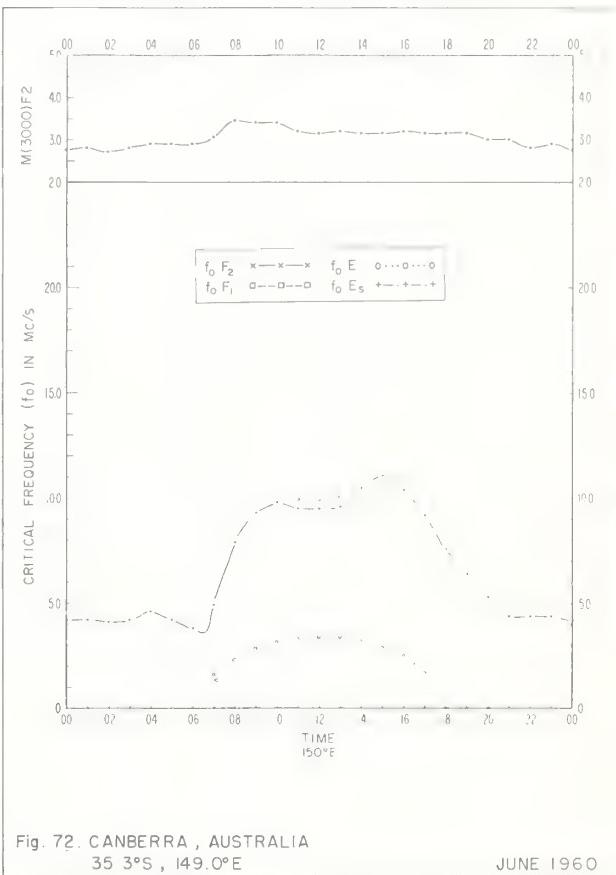
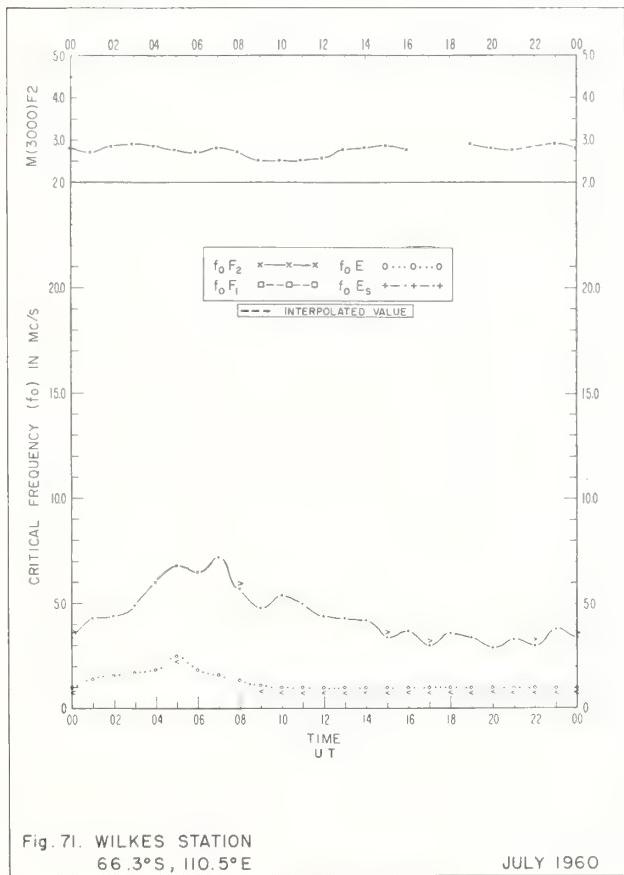
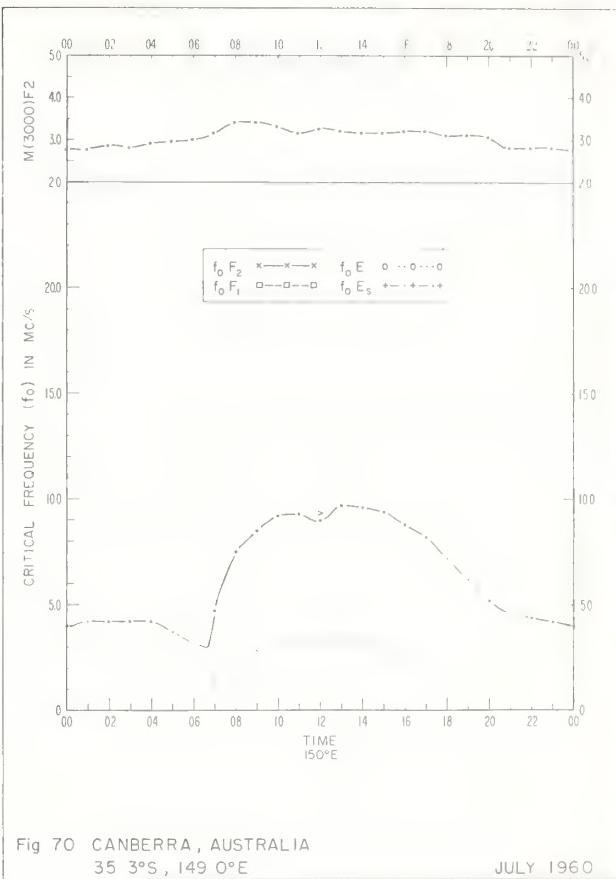
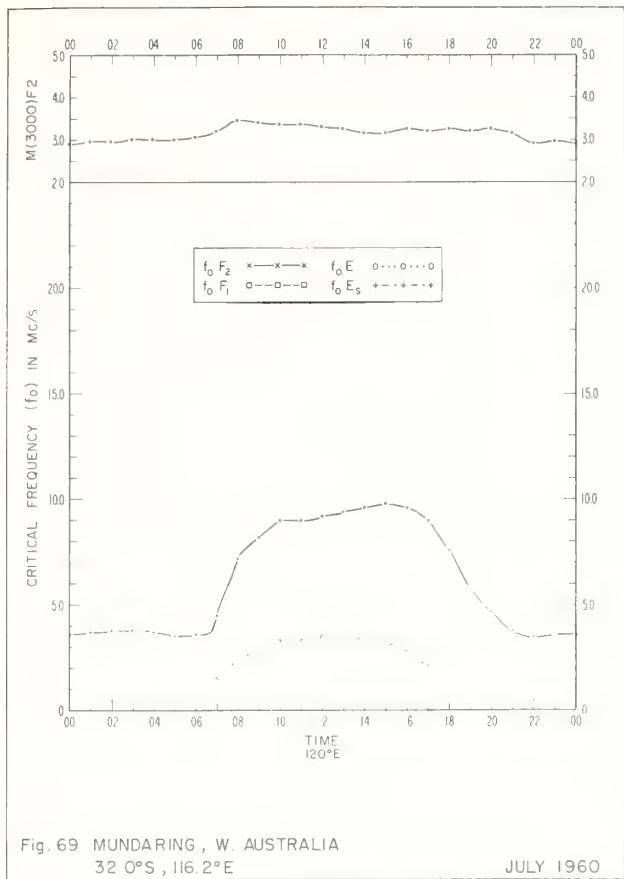


Fig 68 TOWNSVILLE, AUSTRALIA  
19° 3'S, 146° 7'E JULY 1960



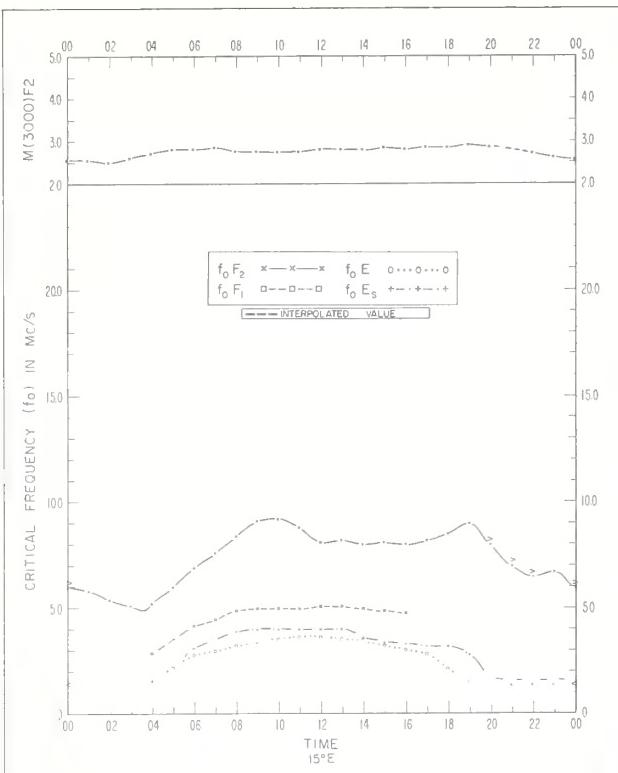


Fig. 73 WARSAW, POLAND  
52°N, 21°E

MAY 1960

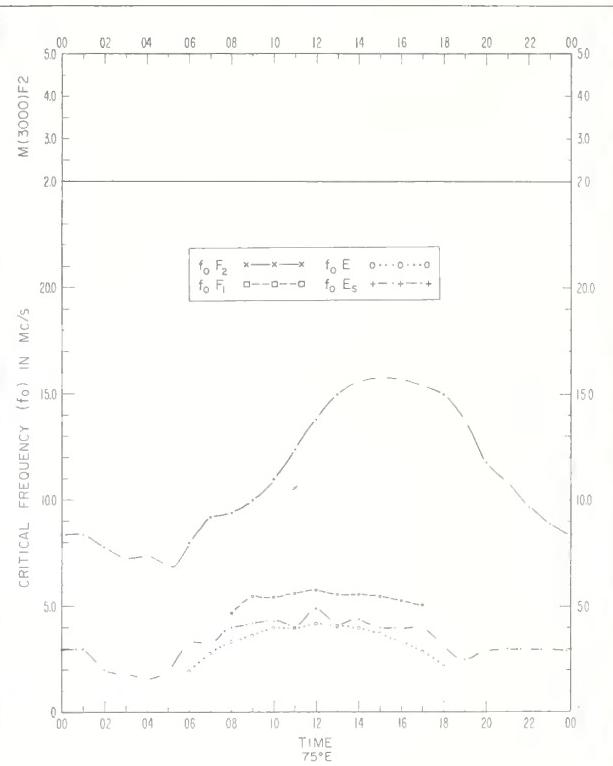


Fig. 74 AHMEDABAD, INDIA  
23.0°N, 72.6°E

MAY 1960

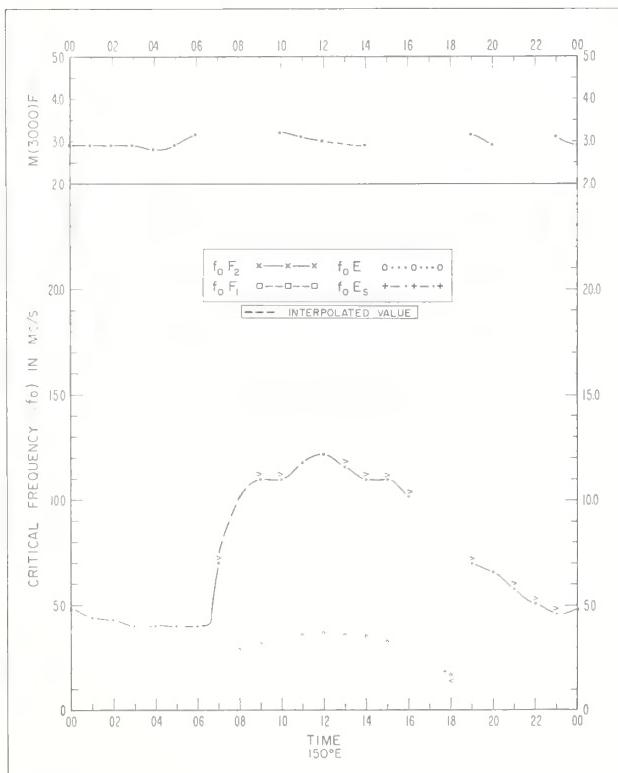


Fig. 75. TOWNSVILLE, AUSTRALIA  
19.3°S, 146.7°E

MAY 1960

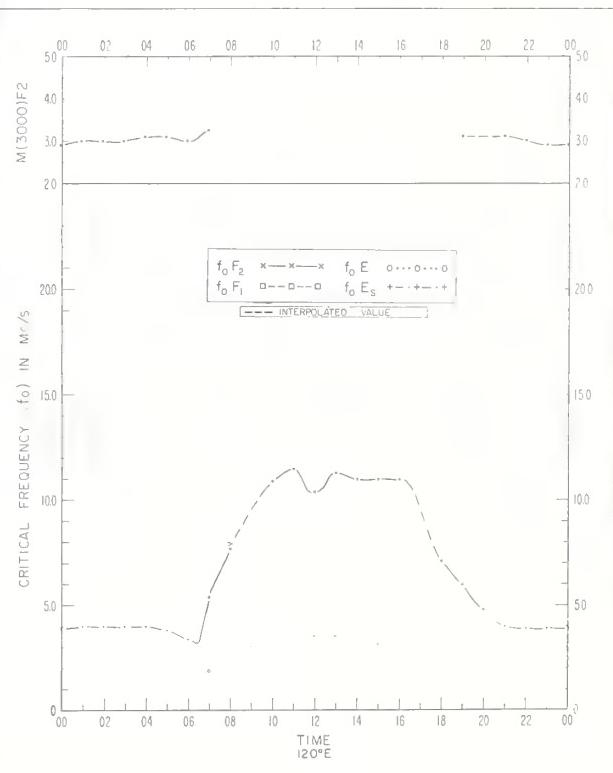


Fig. 76 MUNDARING, W. AUSTRALIA  
32.0°S, 116.2°E

MAY 1960

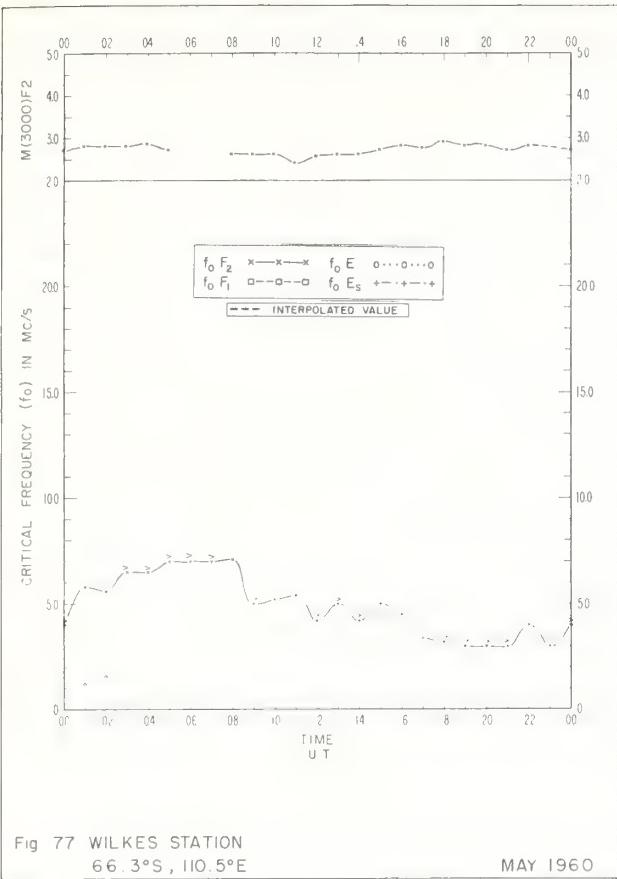


Fig. 77 WILKES STATION  
66.3°S, 110.5°E MAY 1960

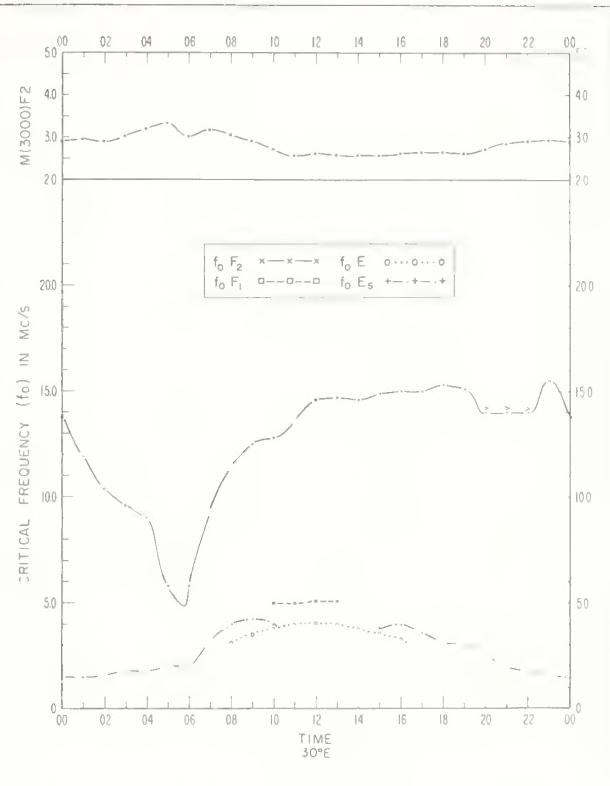


Fig. 78. LWIRO, CONGO  
2.3°S, 28.8°E APRIL 1960

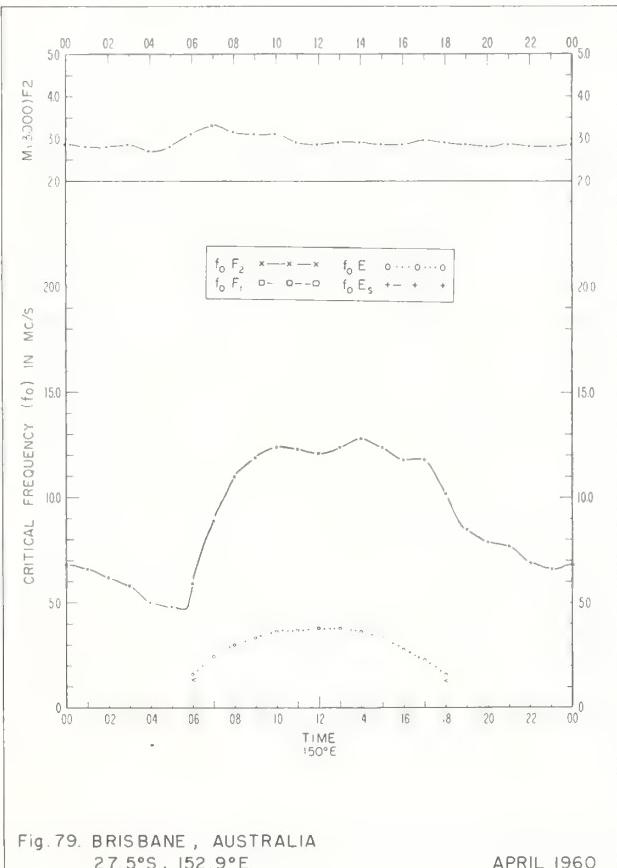


Fig. 79. BRISBANE, AUSTRALIA  
27.5°S, 152.9°E APRIL 1960

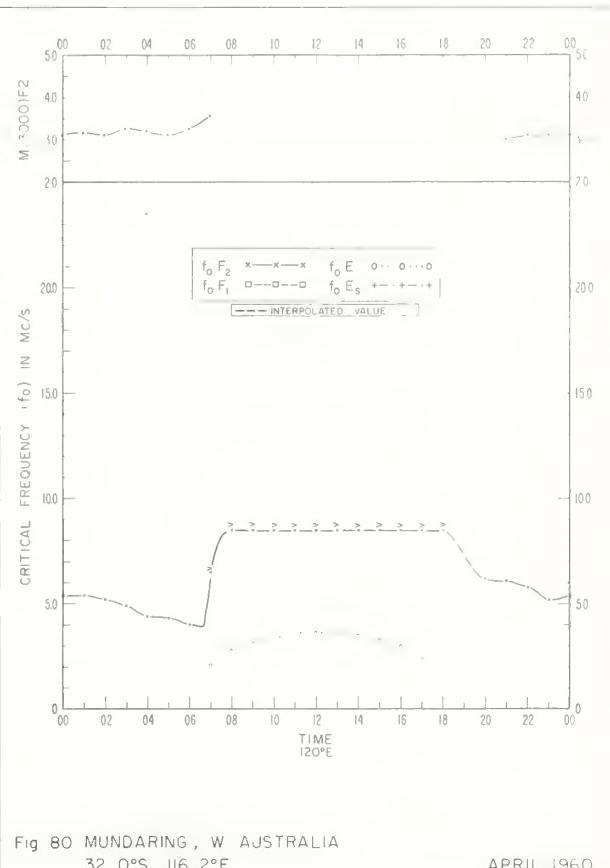
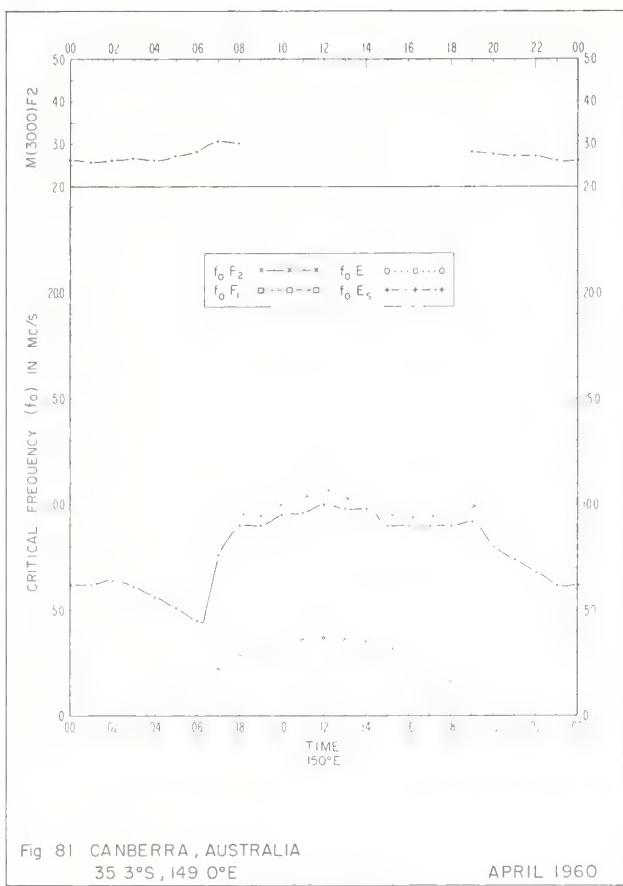
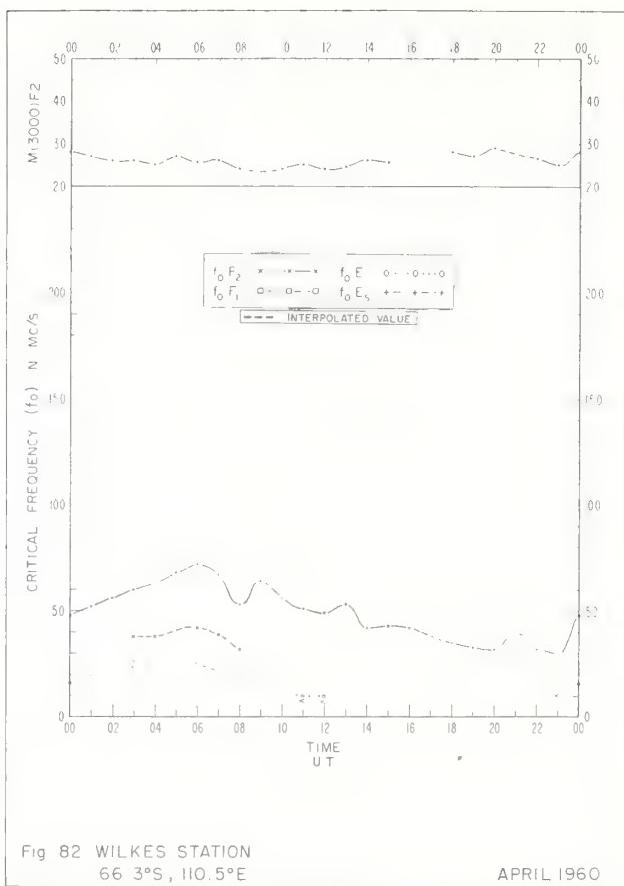


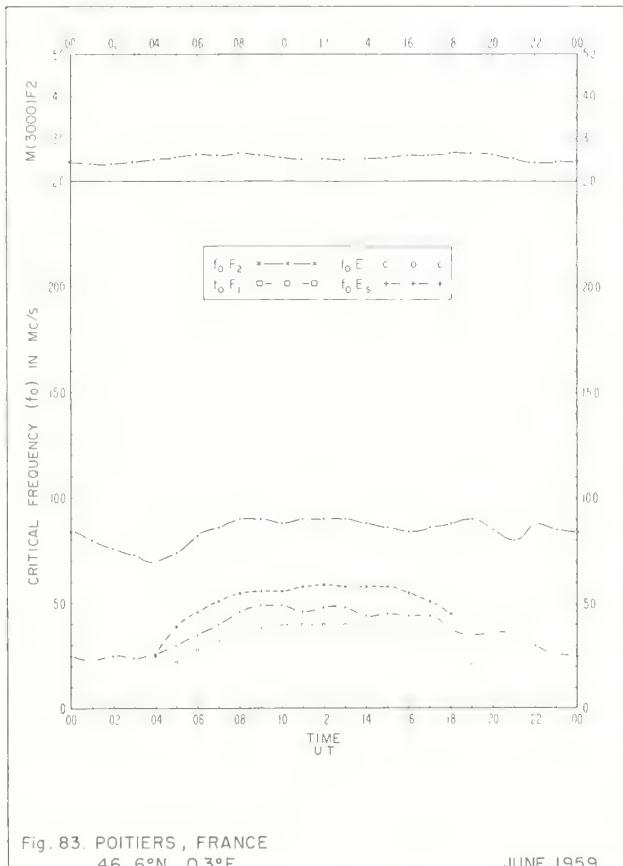
Fig. 80 MUNDARING, W AUSTRALIA  
32.0°S, 116.2°E APRIL 1960

Fig. 81 CANBERRA, AUSTRALIA  
35.3°S, 149.0°E

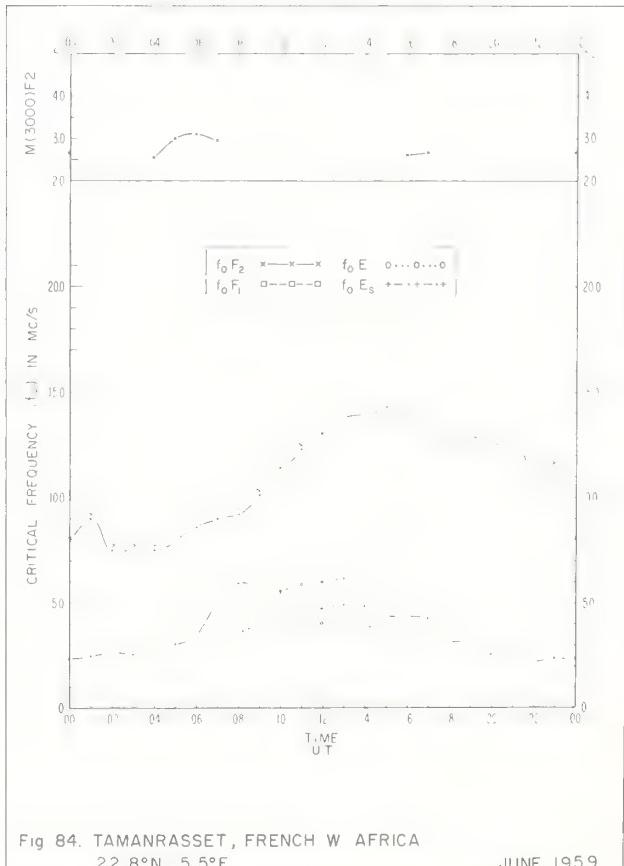
APRIL 1960

Fig. 82 WILKES STATION  
66.3°S, 110.5°E

APRIL 1960

Fig. 83. POITIERS, FRANCE  
46.6°N, 0.3°E

JUNE 1959

Fig. 84. TAMANRASSET, FRENCH W AFRICA  
22.8°N, 5.5°E

JUNE 1959

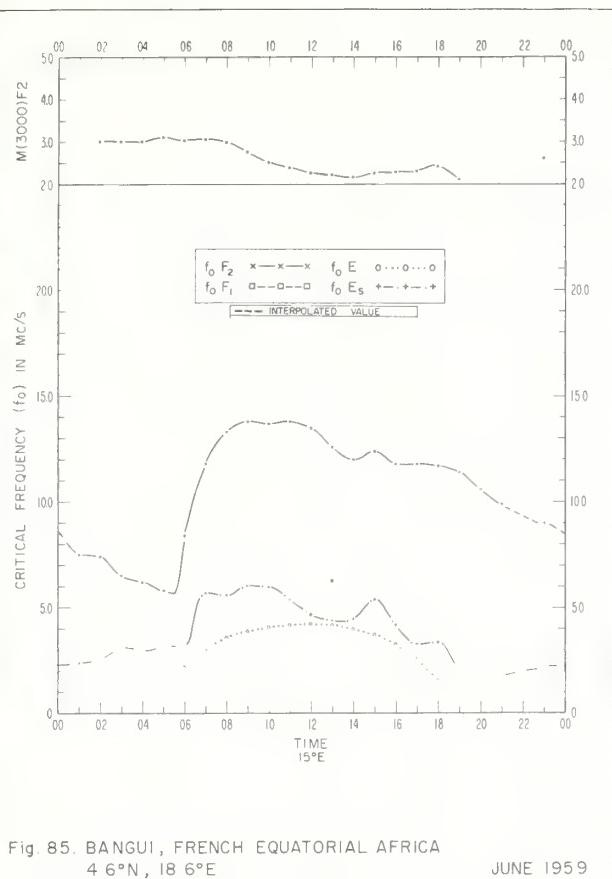


Fig. 85. BANGUI, FRENCH EQUATORIAL AFRICA  
4 6°N, 18 6°E JUNE 1959

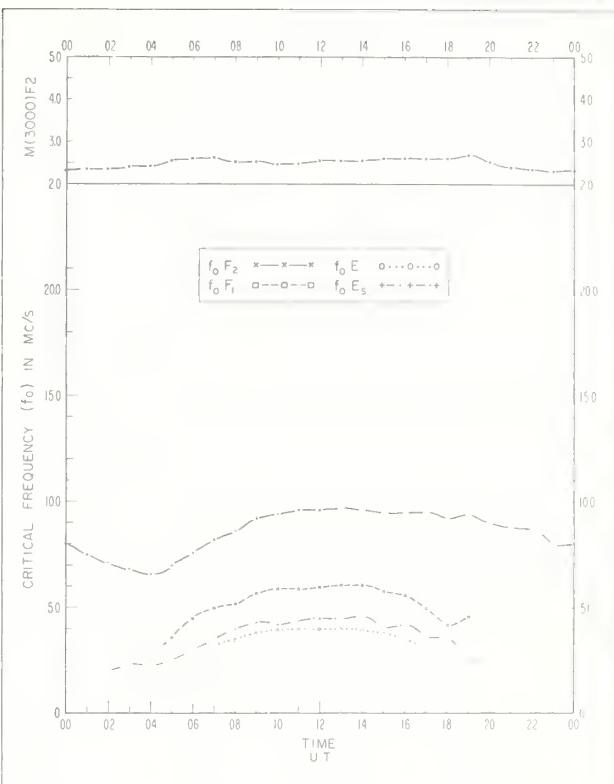


Fig. 86 POITIERS, FRANCE  
46.6°N, 0.3°E MAY 1959

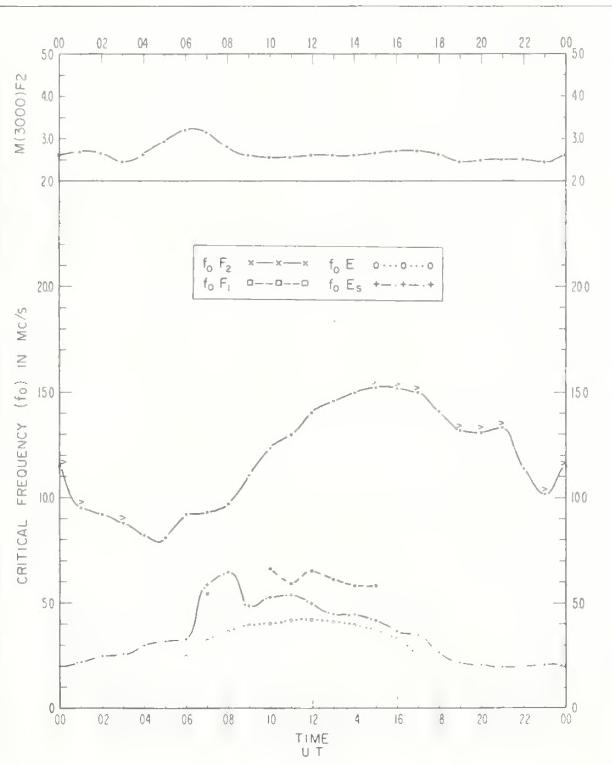


Fig. 87. TAMANRASSET, FRENCH W. AFRICA  
22.8°N, 5.5°E MAY 1959

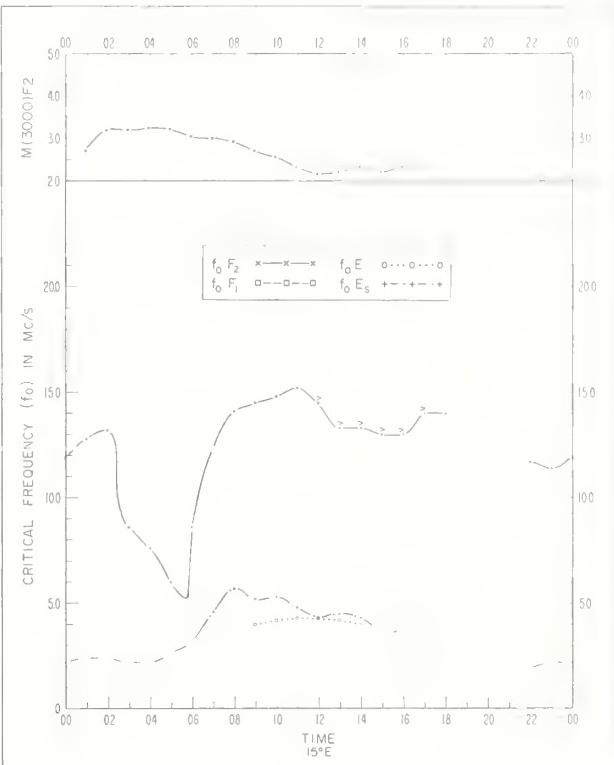
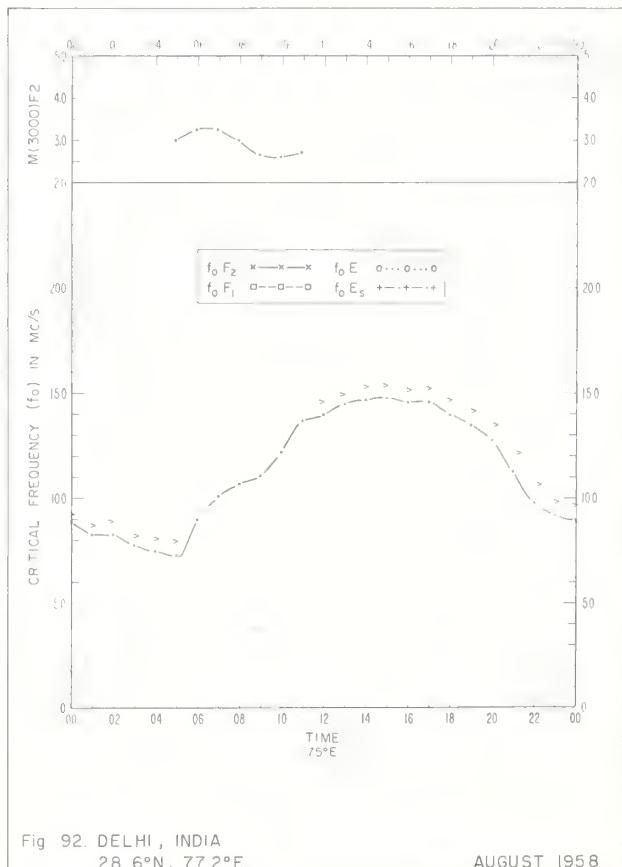
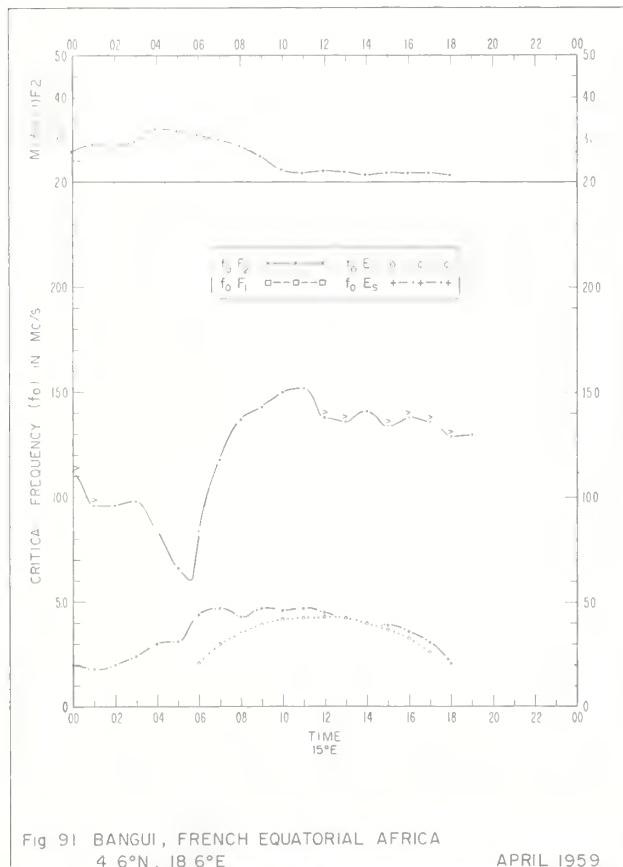
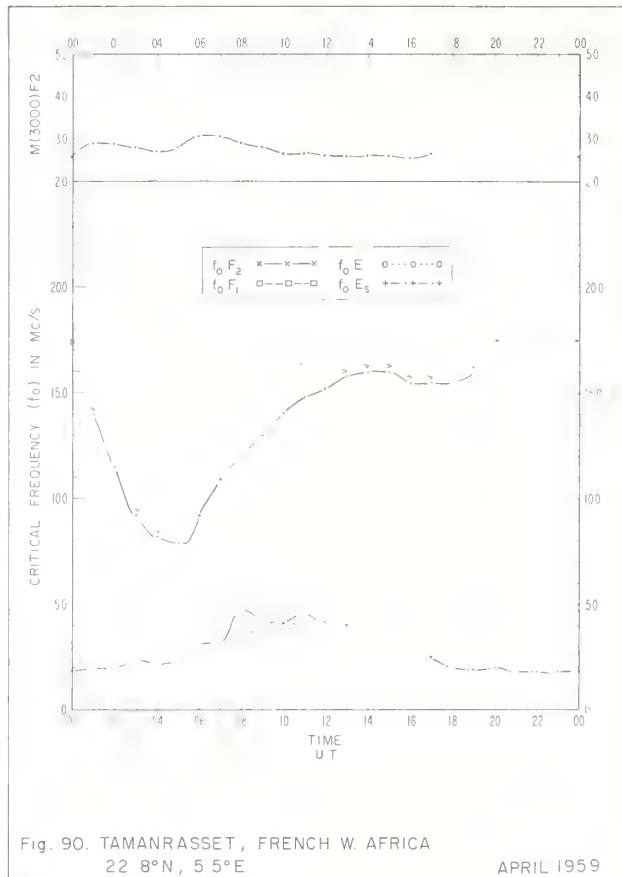
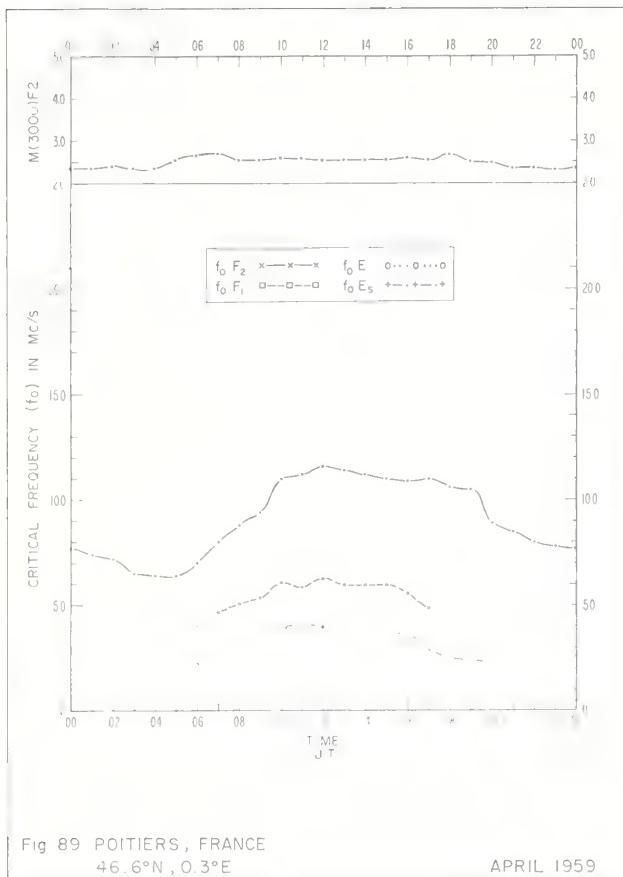


Fig. 88 BANGUI, FRENCH EQUATORIAL AFRICA  
4.6°N, 18 6°E MAY 1959



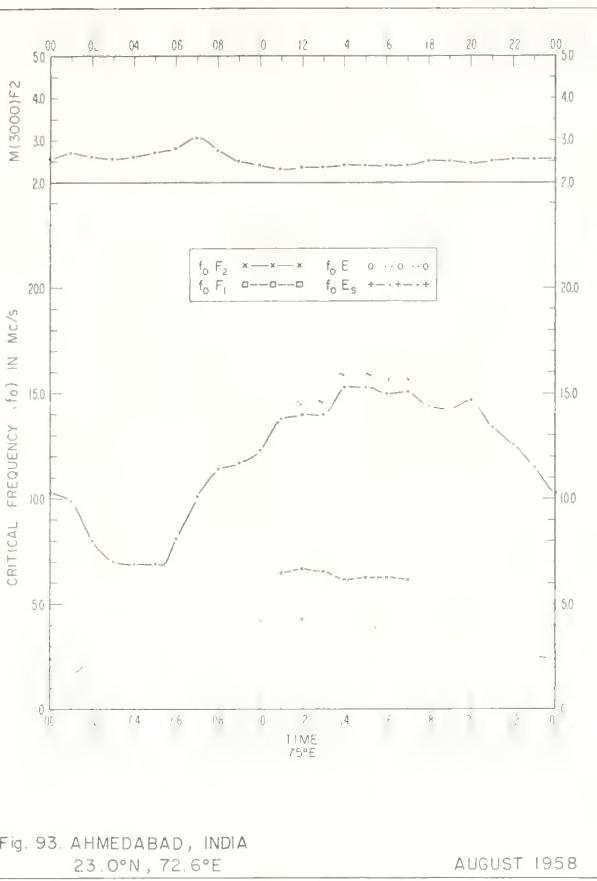


Fig. 93. AHMEDABAD , INDIA  
23.0°N , 72.6°E

AUGUST 1958

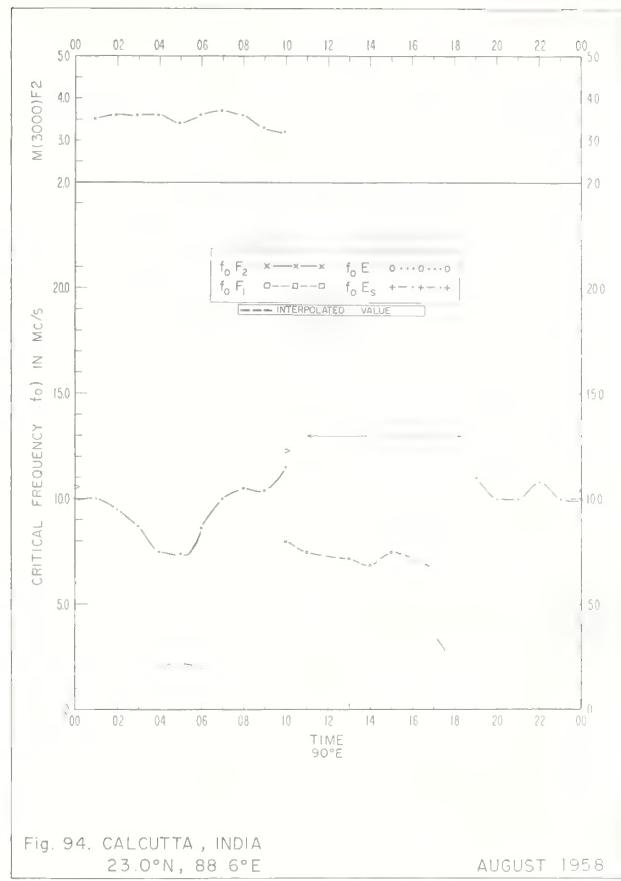


Fig. 94. CALCUTTA , INDIA  
23.0°N , 88.6°E

AUGUST 1958

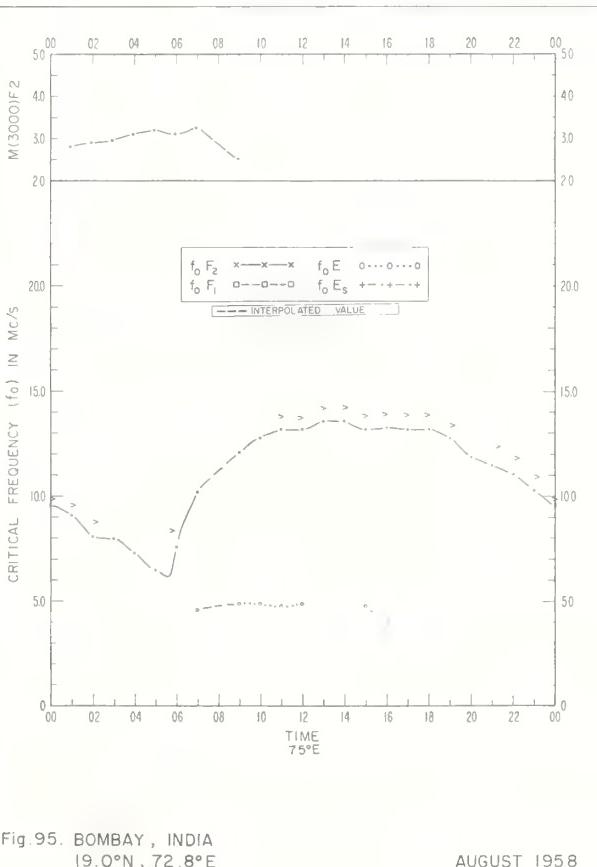


Fig. 95. BOMBAY , INDIA  
19.0°N , 72.8°E

AUGUST 1958

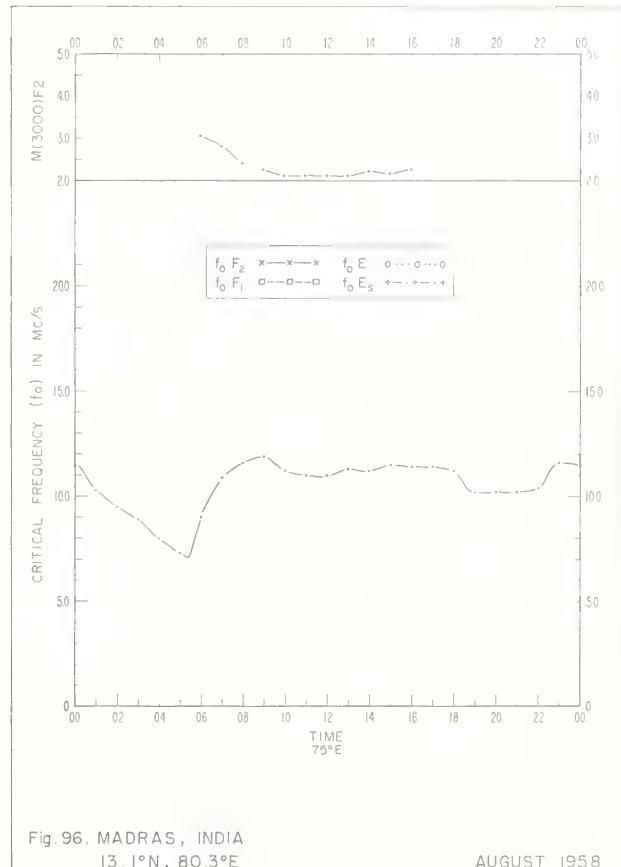


Fig. 96. MADRAS , INDIA  
13.1°N , 80.3°E

AUGUST 1958

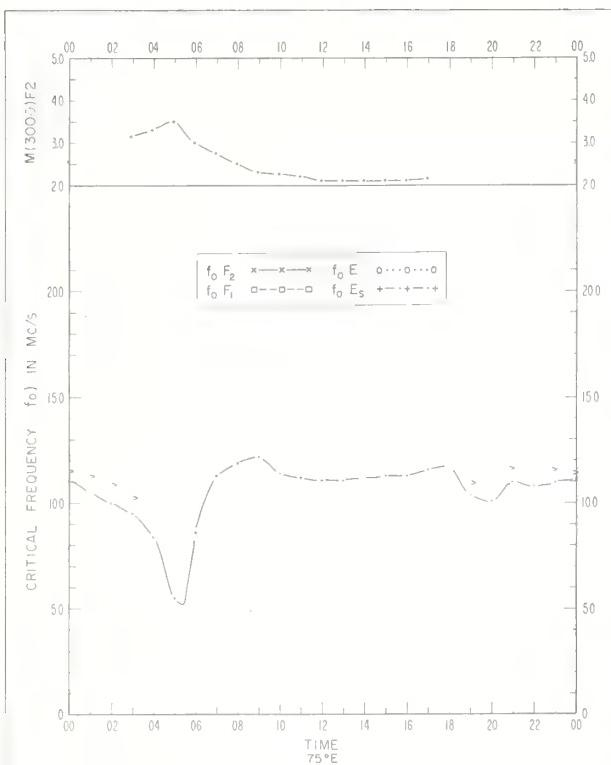


Fig. 97 TIRUCHY, INDIA  
IO 8°N, 78.7°E

AUGUST 1958

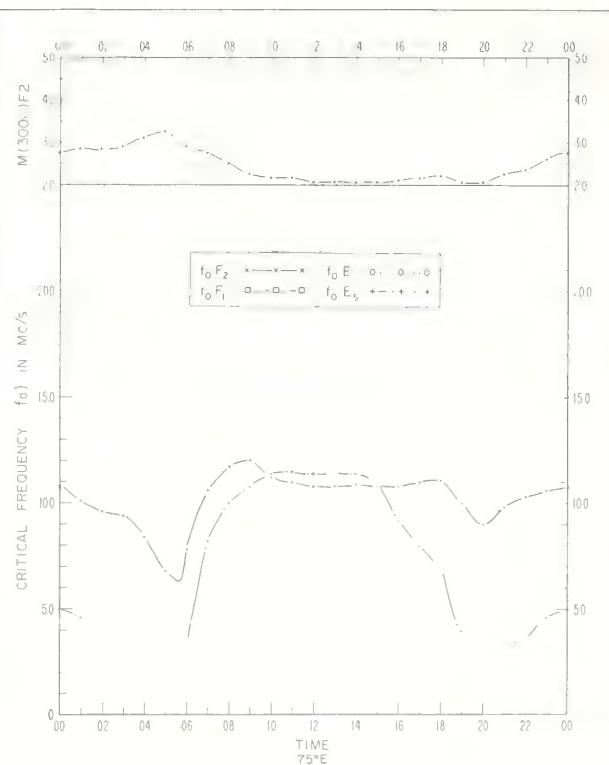


Fig. 98 KODAIKANAL, INDIA  
IO. 2°N, 77.5°E

AUGUST 1958

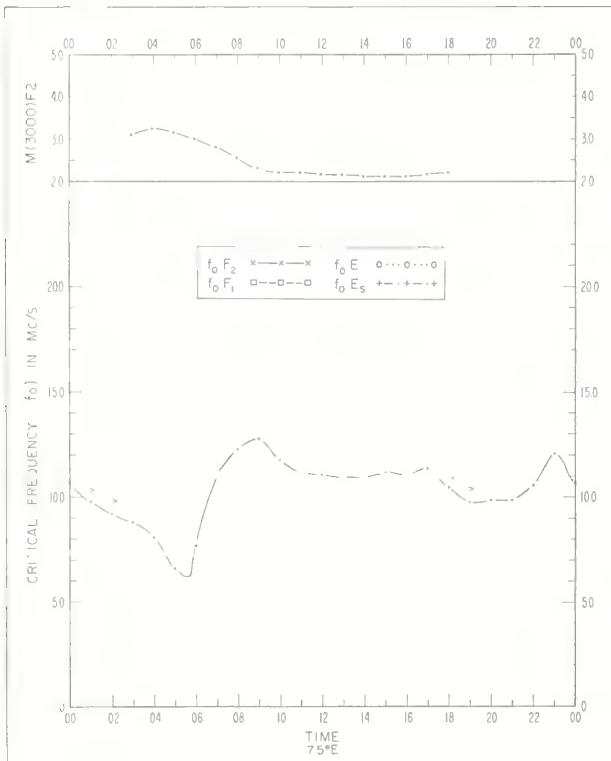


Fig. 99 TRIVANDRUM, INDIA  
8.5°N, 77.0°E

AUGUST 1958

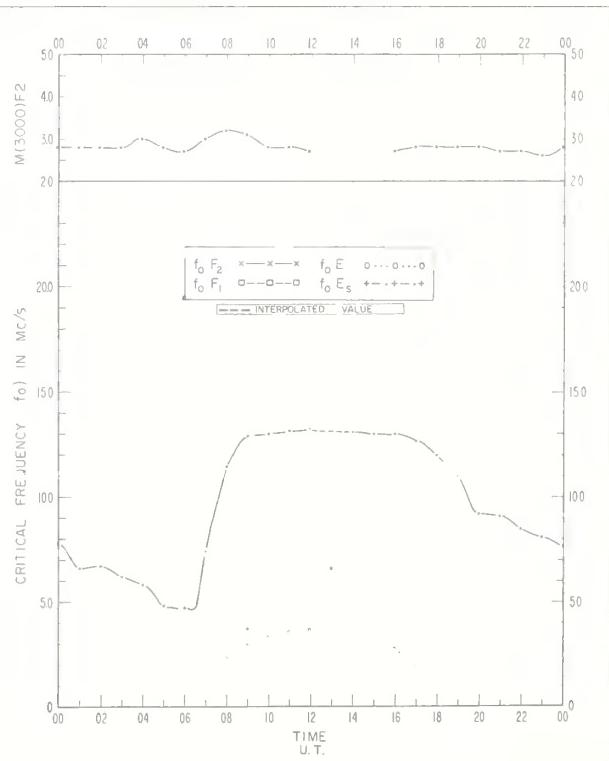


Fig. 100 CASABLANCA, MOROCCO  
33.6°N, 7.6°W

NOVEMBER 1956

## INDEX OF IONOSPHERIC DATA IN CRPL F223

PAGE  
TABLE FIGURE

ADAK, ALASKA	1962	FEB.	8	33
AHMEDABAD, INDIA	1958	AUG.	24	49
	1960	MAY	19	44
	1962	FEB.	8	33
	1962	MAR.	7	32
ANCHORAGE, ALASKA	1962	MAR.	7	32
ATHENS, GREECE	1961	APR.	13	38
BAGUIO, P. I.	1961	OCT.	10	35
	1962	FEB.	9	34
	1962	MAR.	8	33
	1962	APR.	5	30
	1962	MAY	3	28
	1962	JUNE	2	27
	1962	JULY	1	26
	1962	SEPT.	1	26
BANGUI, FRENCH EQUATORIAL AFRICA	1959	APR.	23	48
	1959	MAY	22	47
	1959	JUNE	22	47
BARROW, ALASKA	1962	MAR.	6	31
	1962	MAY	2	27
BOMBAY, INDIA	1958	AUG.	24	49
BRISBANE, AUSTRALIA	1960	APR.	20	45
	1961	JAN.	15	40
	1962	APR.	6	31
BUENOS AIRES, ARGENTINA	1961	JAN.	15	40
	1961	FEB.	14	39
	1961	MAR.	14	39
CALCUTTA, INDIA	1958	AUG.	24	49

	INDEX OF IONOSPHERIC DATA	IN CRPL	F223	PAGE	TABLE	FIGURE
CANBERRA, AUSTRALIA	1960 APR. 1960 JUNE 1960 JULY 1960 SEPT. 1962 APR.	APR. JUNE JULY SEPT. APR.	21 18 18 17 6	46 43 43 42 31		
CASABLANCA, MOROCCO	1956 NOV.	NOV.	25	50		
CHURCHILL, CANADA	1962 APR.	APR.	4	29		
CONCEPCION, CHILE	1961 JUNE	JUNE	13	38		
DAKAR, FRENCH W. AFRICA	1961 SEPT.	SEPT.	11	36		
DELHI, INDIA	1958 AUG.	AUG.	23	48		
DJIBOUTI, FRENCH SOMALILAND	1961 JAN.	JAN.	15	40		
DOURBES, BELGIUM	1961 JAN. 1962 APR.	JAN. APR.	14 4	39 29		
FAIRBANKS, ALASKA	1962 JAN.	JAN.	9	34		
FALKLAND IS.	1960 SEPT. 1961 JAN.	SEPT. JAN.	17 16	42 41		
FORMOSA, CHINA	1962 APR.	APR.	5	30		
FT. MONMOUTH, NEW JERSEY	1962 MAR.	MAR.	7	32		
GRAZ, AUSTRIA	1962 JAN. 1962 APR.	JAN. APR.	9 5	34 30		
KODAIKANAL, INDIA	1958 AUG.	AUG.	25	50		
LA PAZ, BOLIVIA	1961 JULY	JULY	12	37		

## INDEX OF IONOSPHERIC DATA IN CRPL F223

PAGE  
TABLE FIGURE

LWIRO, CONGO	1960	APR.	20	45
	1960	SEPT.	16	41
MADRAS, INDIA	1958	AUG.	24	49
MUNDARING, W. AUSTRALIA	1960	APR.	20	45
	1960	MAY	19	44
	1960	JULY	18	43
	1960	SEPT.	16	41
	1962	MAR.	8	33
	1962	MAY	3	28
	1962	JUNE	2	27
NARSSARSSUAQ, GREENLAND	1961	SEPT.	11	36
	1961	NOV.	10	35
	1961	DEC.	10	35
	1962	APR.	4	29
OKINAWA I.	1961	JULY	12	37
	1961	SEPT.	11	36
	1962	MAY	3	28
OTTAWA, CANADA	1962	MAR.	7	32
PARIS, FRANCE	1961	SEPT.	11	36
POITIERS, FRANCE	1959	APR.	23	48
	1959	MAY	22	47
	1959	JUNE	21	46
RESOLUTE BAY, CANADA	1962	MAR.	6	31
ROME, ITALY	1962	JUNE	2	27
	1962	JULY	1	26
ST. JOHNS, NEWFOUNDLAND	1962	JUNE	1	26
TAHITI, SOCIETY IS.	1961	SEPT.	12	37

	INDEX OF IONOSPHERIC DATA	IN	CRPL	F223
		PAGE	TABLE	FIGURE
TAMANRASSET, FRENCH W. AFRICA	1959 1959 1959	APR. MAY JUNE	23 22 21	48 47 46
TANANARIVE, MADAGASCAR	1961	SEPT.	12	37
TIRUCHY, INDIA	1958	AUG.	25	50
TOWNSVILLE, AUSTRALIA	1960 1960	MAY JULY	19 17	44 42
TRIVANDRUM, INDIA	1958	AUG.	25	50
UPPSALA, SWEDEN	1962	APR.	4	29
WARSAW, POLAND	1960 1960 1961 1962	MAY SEPT. JUNE JAN.	19 16 13 9	44 41 38 34
WASHINGTON, D.C.	1962	MAY	3	28
WHITE SANDS, NEW MEXICO	1961 1961 1961 1961	JAN. FEB. MAY OCT.	15 14 13 10	40 39 38 35
WILKES STATION	1960 1960 1960 1960	MAY JULY APR. SEPT.	20 18 21 17	45 43 46 42
WINNIPEG, CANADA	1962	APR.	5	30

---

## CRPL REPORTS

(A detailed list of CRPL publications is available from the Central Radio Propagation Laboratory on request.)

### Catalog of Data.

A catalog of records and data on file at the U.S. IGY World Data Center A for Airglow and Ionosphere, Boulder Laboratories, National Bureau of Standards, Boulder, Colorado, which includes a fee schedule to cover the cost of supplying copies, is available upon request.

CRPL-F (Part A), "Ionospheric Data."

CRPL-F (Part B), "Solar Geophysical Data."

These monthly bulletins have limited distribution and are sent, in general, only to those individuals and scientific organizations that collaborate in the exchange of ionospheric, solar, geomagnetic, or other radio propagation data of interest to the CRPL. Others may purchase copies of the same data from the U.S. IGY World Data Center A for Airglow and Ionosphere, National Bureau of Standards, Boulder, Colorado.

### "Ionospheric Predictions."

This series of publications is issued monthly, three months in advance, as an aid in determining the best sky-wave frequencies for high frequency communications over any transmission path, at any time of day for average conditions for the month.

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. Price 15 cents. Annual subscription (12 issues) \$1.50 (50 cents additional for foreign mailing).

(NOTE: Tested sets of punched cards of the predicted numerical coefficients of numerical maps of the Ionospheric Predictions, for use with electronic computers, may be purchased by arrangement with the Prediction Services Section, CRPL, Boulder Laboratories, Boulder, Colorado.)

National Bureau of Standards Handbook 90, "Handbook for CRPL Ionospheric Predictions Based on Numerical Methods of Mapping." Price 40 cents.

National Bureau of Standards Circular 462, "Ionospheric Radio Propagation." Price \$1.25.

NBS Handbook 90 and NBS Circular 462 for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C.

---

